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ORIGINAL ARTICLES.

PNEUMATURIA.

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During the last two centuries observations of the passage of gas with the urine have been made from time to time by various authors, and lately a number of very detailed accounts of this phenomenon have appeared. Brierre de Boismont in 1825 mentioned the spontaneous production of gas in the bladder and considered it due to a sort of flatulence or secretion of gas by the bladder mucosa. Roche confirmed this and Chomel added to the suggestion of gaseous secretion from the membrane, the idea that the gas might be due to fermentation. But up to 1860 practically all the instances were in cases of fistulous communication between the bladder and intestine, and when in that year Raciborski was called to treat a man who passed bubbles of gas from the urethra he first satisfied himself that there was no vesico-enteric fistula, before describing the case as one of spontaneous development of gas in the bladder.

The cases of pneumaturia may be roughly divided into three groups:

1. Those in which air is mechanically introduced into the bladder from without.

2. Those in which gas develops in the urinary tract through the agency of some fermenting organism.

3. Those in which there is a communication between the bladder and an air-holding viscus.

The first group is of little practical importance, as the discomfort is transient and the phenomenon has no pathologic significance. The introduction of air may occur during irrigation of the bladder if the apparatus used is not emptied of air before the fluid is allowed to flow. More commonly is the condition brought about by the knee-breast position occupied by the patient during the cytoscopic examination as practiced by Dr. Kelly, when it forms the basis of the method of examination—the sagging of the viscera produces a negative pressure on the bladder walls which is neutralized as far as possible by the amount of air distending the bladder. After such examination when the patient is replaced in the dorsal position the air should be pressed out through a catheter, as otherwise the distention may cause considerable pain. The operation of lithotomy and the vesical operations are also sometimes followed by passage of gas into and out of bladder.

The second group of cases depends on the invasion of the urinary tract by some organism which by its action on the urine produces gas. In most of these cases the gas was produced in the urinary bladder, but in a few the kidney was evidently the seat of the infection, and in one there was a general distention of the whole tract.

Since as yet we know so little of the etiologic factors in these cases we can hardly attempt any division of the cases on such a basis. Up to the time of Favre, who isolated an organism in 1888, no attempt was made to recognize the causative agent. Most of the cases described occurred in middle-aged or old men, where there had been for some time some obstruction to the flow of urine—such as an enlargement of the prostate or gonorrheal stricture—in others there were vesical calculi. In two cases there was paralysis following myelitis. Of the sixteen cases described nine were found to have glycosuria. The data are not sufficient to determine the reaction of the urine in all cases but the majority were acid up to the time when the determining factor of the pneumaturia appeared—that is the catheterization, sounding, lithotrity, lithotomy, etc., one of which was performed in practically all the cases and was very quickly followed by the passage of gas. The reaction of the urine after the introduction of the organism by the catheter varies with the nature of the infection.

In three cases (those of Heyse, Guiard, and Pére) there is no definite history of catheterization before the emission of gas, but there was an increase in the amount of gas after such instrumentation, and it is now practically universally recognized that such introduction of the infection by means of instruments passed into the bladder is the essential factor in the production of pneumaturia of this type.

The various conditions described as existing previous to catheterization or sounding are predisposing causes. The residual urine present in the bladder when there is some obstruction to free egress forms a favorable medium for the growth of organisms and other slight infections, associated with the presence of an obstruction and atony of the bladder, or with the presence of vesical calculi, are often favorable to the invasion of the gas-forming organism. Further, stress has been laid by Guiard and others on the importance of the presence of sugar in the urine in the production of pneumaturia, and indeed in the sixteen recorded cases there was glycosuria in nine, with one more doubtful case. Guiard himself reports four such cases. Dumesnil, Ralfe, Müller, Senator and Pére report others. Of these cases the organism was recognized in only two, that of Senator, where there was a yeast, and that of Pére, where a bacillus resembling the bacillus coli communis was the gas-producer.

In sugar-free urines the formation of gas has been observed in several cases, and from the number Favre, Schow and Heyse have made detailed bacteriologic studies. The organisms described by these authors are almost identical, differing only in details, in which there is always some variation. They all belong to the group of which the bacillus coli communis is the type, and Heyse has identified the organism in his case

with the bacillus lactis aërogenes. Schow names the one found in his case coccobacillus aërogenes vesicæ. The following are the main characteristics of the three organisms; they are plump, short rodlets sometimes occurring in pairs: they grow aërobically on the various media, forming gas in the gelatin stab cultures and not liquefying the gelatin. Favre's bacillus is motile, Schow's slightly so and Heyse's non-motile. Favre's form shows an inequality in staining, suggesting the formation of spores. Urine media become alkaline after the growth of the organisms excepting Favre's, which produces acid. Heyse's bacillus is said to produce acid also by changing lactose into lactic acid. The organisms are pathogenic to rabbits. Heyse's also to guinea-pigs and mice. The gases produced are carbon dioxid, oxygen, nitrogen, hydrogen and marsh gas.

One of the cases in which the bladder was found distended with gas is described by Welch and Flexner. In this case the organism was the bacillus aërogenes capsulatus (Welch) which is distinguished by its size and aërobic growth. The gas produced was chiefly hydrogen and burned with blue flame.

As to the actual mode of formation of the gas we have various ideas. Guiard upholding his claim that glycosuria is the basis of all such pneumaturias, considers it an alcoholic fermentation, with the liberation of CO_2, and thinks we should find alcohol in the urine, and this has been actually done by Senator, who found in the case where a yeast was the aerogenic factor alcohol in the urine and CO_2 as the gas.

Obviously this is the explanation of the decrease in the sugar in the urine of diabetics after the beginning of a cystitis, and the formation of the fatty acids as an extension of the process explains the acidity of the urine in such a case.

In the cases where the urine is sugar-free the analyses of the gas produced have showed the presence of CO_2, and H_2N_2O, and CH_4 have also occurred, but it is suggested by Senator that these are absorbed merely from the blood. Just what is decomposed in sugar-free urine by the organisms is still doubtful.

The quantitative analyses vary so much that it is difficult to draw any general conclusions from them. In all, however, hydrogen forms the main bulk.

Other suggestions are offered as to the formation of the gas. Ralfe thinks that during the formation of acetone from aceto-acetic acid in the urine of diabetics gas might be developed. Kehrer, in describing a case of hydronephrosis in which the hydronephrotic sac was distended with gas, suggests that from the remains of the kidney tissue normal acid urine was secreted at intervals and that this set free the CO_2 from the carbonates in solution in the stagnating urine in the sac.

The symptoms in these cases are not very striking. There may be continual desire to urinate, but it is rather a result of the cystitis than of the presence of the gas, which collects in rather small amounts. The passage of the gas per urethra causes no pain, but rather a tickling sensation, and is accompanied by a souffle or even by a distinct explosive report, or a musical sound. The bladder tympany may extend almost into the umbilical region at times, but unless the patient be actually inverted, the curve and situation of the urethra is such that no gas passes until after most of the urine has been passed. The gas may pass in such large bubbles as to give rise to intermissions in the flow of the urine, or if in very small quantity it may merely form froth at the end of micturition.

Recovery occurred in practically all of the cases, the urine clearing up and again becoming acid: treatment with antiseptic lavage often greatly hastened this. The fatal termination of a few of the cases was due rather to infection of other organs than the bladder—pyonephritis with uremia.

Rather distinct from this class of cases is the group forming perhaps part two of the second division—those cases where the gas is produced in the kidney and ureter rather than in the bladder itself. Of such cases three have been reported, and a fourth has occurred during the last year at the Johns Hopkins Hospital in my own clinic. LeDentu in his textbooks cites a case observed by Lannelongue in a child aged 8, where there was a voluminous tumor in the right flank, at first mistaken for the liver. On aspiration 500 c.c. of a greenish fluid was obtained, together with a gas composed of oxygen, nitrogen and carbon dioxid. At autopsy the tumor was shown to be a renal cyst. LeDentu himself perfromed nephrectomy in a case where there was a renal calculus and an accumulation of gas in the kidney This gas, as in the case of Lannelongue, was composed of oxygen, nitrogen and carbon dioxid, and he gives it as his opinion that the gas was absorbed from the blood. In the case of Tisné there was pyonephritis, with formation of a perinephritic abscess following obstruction from an enlarged prostate; evacuation of the abscess put an end to the discharge of gas from the bladder. The history of the case observed at the Johns Hopkins Hospital is briefly as follows:

Mrs. J. H., aged 36, married fifteen years, II-para, normal labors. About four months after marriage noted pain on urination. Two years later began to pass minute white calculi and during the next four years passed three larger calculi with much pain. At present has pain and swelling in left lumbar region and constant pain in bladder, especially just before urination; the urine always contains pus; for one year has passed gas from urethra in large amounts. Left kidney is felt as a hard tumor the size of two fists.

Cystoscopic examination. No. 10 cystoscope. Bladder mucosa normal. Right ureteral orifice easily found and normal in appearance and the urine clear issuing from it. The left ureteral orifice found by seeing issuing from it pus and gas bubbles. This was wiped away and the ureter easily discovered surrounded by a reddish area. On pressure over the kidney pus could be squeezed out of the ureter, and mixed with the pus were numerous air bubbles. On attempting to pass a metal catheter, a stricture of the lower portion of the ureter was discovered. A flexible, wax-tipped one and one-half mm. catheter was easily passed on first attempt and entered to the kidney; no scratch marks on the wax. Pus withdrawn was thick, viscid and of a foul odor.

Nephrotomy was done and a drainage tube inserted into the kidney, after evacuating the gas and washing out the pus which was found in its cavity. The patient made an uninterrupted recovery.

Cultures from the kidney were not definitely successful in isolating a single organism. Coverslips from the pus showed various forms, slender bacilli in chains, stout bacilli in chains and groups of cocci or short bacilli beside diplococci resembling the pneumococcus. The cultures showed mainly coccus-like organisms which did not liquefy gelatine, although the growth was here, as on agar, abundant; litmus milk decolorized and coagulated with the formation of acid; no formation in lactose agar nor in urine lactose agar. Scant growth on potato and in bouillon, the bouillon becoming clouded.

In the last group of cases the gas reaches the bladder through a fistulous communication with some air-holding viscus, which is in the great majority of the cases the intestine. Observations on such fistulas have been rather numerous, and the literature has grown to a considerable extent, especially in the last

fifty years. Among the most important publications are those of Blanquinque and Harrison Cripps, the latter of whom reviewed sixty-three cases in the literature. Chavannaz within the last few months has written very fully on the subject, considering, however, only such fistulas as occur in men.

Communication between the bladder and intestine may originate in the most various ways, and the cases may be roughly divided as follows: 1, congenital fistulas; 2, cases of traumatic origin; 3, cases in which the fistula results from necrosis of tissue between the cavity of the bladder and that of the intestine.

Savoy and Minich have described cases of atresia ani in very young children, in which the intestinal contents were evacuated through the bladder by way of a fistulous connection between the bladder and the rectum. This was probably a congenital malformation rather than the result of the accumulation of the feces. Treatment by the restoration of the natural anal orifice resulted in the cure of the condition.

Traumatism plays a relatively small part in the production of vesico-enteric fistulas, and the fistulas so formed are much more amenable to treatment than those in which the formation is associated with a diseased condition of the adjoining tissues. Billroth and Fischer have reported cases in which passage of gas through the bladder followed wounding of the rectum in lithotomy and in the cases reported by Dittel, Johnstone and Canton the fistulous perforation was due to violent catheterism. Gunshot wounds, stabs, protracted labors and retention catheters have been the cause in other cases, but by far the most common, traumatic origin seems to be in wounds of the rectum caused by falling on some sharp object, which, entering the rectum, passes through the intervening tissues into the bladder.

The tissues being in good condition, healing often takes place if the patient is merely kept at rest and the bladder and rectum kept as free as possible. In most of the cases frequent catheterization or the introduction of a retention catheter has been resorted to. Chavannaz states that the traumatic cases form 13.86 per cent. of all cases in men, but if we consider the fistulas in women, also, this is a rather too high estimate, and the figures approach more nearly to 11.4 per cent. of all cases.

The non-traumatic fistulas are produced by the necrosis of tissue between the cavity of the bladder and that of the intestine, after these organs have become adherent or by the necrosis of the walls of these organs, so that communication is established through an intervening cavity, such as an abscess cavity.

The old division of these cases into cancerous, tuberculous and inflammatory is adopted by Chavannaz, but it is sometimes rather misleading and the dividing lines can never be sharp. In almost half of the cancerous cases the cancer is only indirectly the cause of the fistula in that it forms a stricture of the intestine, the fistula being produced at a higher level. Chavannaz in his statement that the cancerous cases form more than 20 per cent. of all the cases seems to overlook this—the percentage of fistulas actually due to the breaking down of a cancer, involving both bladder and intestine, is probably under 10 per cent. Several English authors, Hunter, Blizzard, Heuston, Richardson and others have described such cases where the fistula was directly due to the invasion of the bladder wall by the carcinoma, and the subsequent breaking down of the mass. Tavignot, Peron and Czerny have also described similar cases.

Stricture of the rectum seems to have a very important influence in the production of fistulas, whatever may be the origin of the stricture, although no writer has laid especial stress on this point. The intestine above the stricture becomes distended and feces stagnate there; indeed a complete lining of feces may be formed with a secondary lumen through which the liquid stools pass, and such stasis, combined with the severe straining at stool to produce an inflamed condition of the intestinal wall and peritoneal adhesion, are followed by ulceration through the wall into the adjoining bladder. Foreign bodies which have become lodged above the stricture often aid in this process.

From the side of the bladder the causation of fistula is very doubtful. Stricture of the urethra has probably only a predisposing influence in causing cystitis, etc. Mercier describes two cases in which the autopsy showed that ulceration had occurred at the bottom of several of the sacculations or cellules in the bladder wall, and that communication with the intestine had originated in this way.

Calculi have been said to ulcerate through the walls, especially if they have become lodged in depressions, but as Chavannaz remarks, they are more probably the result than the cause of intestino-vesical fistulas. Further, fistulas have been ascribed to the long-continued use of stiff retention catheters and sounds, necrosis of the vesical wall occurring where the beak of the sound pressed upon it: also to the presence in the bladder of long, hard, foreign bodies introduced from without for various purposes.

Probably the largest group is formed by those cases where at autopsy there is no stricture of the intestine nor any carcinomatous mass, but instead peritoneal adhesions between one or more loops of intestine and the fundus of the bladder, with perforation at the point of adhesion. These adhesions may be limited to a very small area, merely forming a thick wall for the fistulous tract, or they may be very extensive, matting the intestines. Flanner describes such a case where the matting was due to a tuberculous peritonitis and Robouam another where, among the coils of adherent intestine, there was a large abscess cavity communicating with the intestine and with the bladder. Frequently the communication is not direct, but through a space walled up by adhesions from the peritoneal cavity in which there is a collection of intestinal contents, urine and pus, and sometimes foreign bodies. Chavannaz has found such a *foyer intermediaire* in 22.10 per cent. of the cases. The course of the fistulous tract is thus not always direct; in some cases the openings are directly opposed, in others the canal is long and tortuous after running for some distance between the coats of the intestine and bladder. This disposition may result in a valvular action of the fistula so that materials can pass only one way.

Fistulas have resulted in various other ways. Rupture of abscesses in the pelvis, into the bladder and intestine, has occurred in a considerable number of cases. This is especially frequent in women, where tubal abscesses and other suppurative processes in the pelvis are common. In men, somewhat similar conditions have occurred, sometimes originating in inflammation of the appendix, although when we consider the number of appendix abscesses that are seen

it is somewhat remarkable that in Chavannaz's statistics the appendix is concerned in the formation of such fistulas in only one case or 1.85 per cent. Very recently Fowler of New York has reported a case in which an appendix abscess was probably the cause of the fistula.

Connection of the two organs by means of an adherent cystic ovary has been described by Simpson, and in an inaugural dissertation Giessler described the formation of communication between the bladder and intestine after the rupture of an extrauterine pregnancy, with discharge of fetal parts through the various channels. Finally, Schoepffer relates the case of a child in which the breaking down of a small-celled sarcoma of the intestine, which had become adherent to the bladder, gave rise to the passage of intestinal contents into the bladder.

Another class of cases originates in tuberculous and suppurative processes in the tissues between the rectum and the bladder. Tuberculosis of the prostate passing into cheesy degeneration with discharge both ways is the basis of several cases; while gonorrheal abscess of the prostate and neighboring tissues may have a similar result.

The situation of the orifice of the fistula is rather important in determining the symptoms and governing the treatment. Chavannaz's statistics are as follows, in the cases in which the point was determined by autopsy: In 44.44 per cent. the communication was with the rectum; in 24.07 per cent. the communication was with the sigmoid; in 11.11 per cent. the communication was with the colon; in 7.40 per cent. the communication was with the colon and ileum; in 1.85 per cent. the communication was with the appendix.

The intestinal as well as the vesical orifices may be multiple and may be situated in different sections of the intestinal canal. This of course complicates greatly the operative treatment, and in the intraperitoneal treatment of such cases the question arises as to whether it is better to resect the intestine or to perform a number of lateral sutures. It will be readily seen that since the rectovesical fistulas form such a large percentage of the cases we may expect to find the majority of all the cases in men, and indeed Chavannaz's statistics uphold this in showing that 70 per cent. of all the cases were in men.

Affection of the kidneys is relatively uncommon, the bladder seeming to act as a protection against the passage of the infection up the ureters. Purulent and ammoniacal cystitides may, however, occur, and obstruction, due to the blocking of the urethra by the fecal matter is not infrequent.

The symptoms vary with the nature and origin of the lesion. There may be no symptoms whatever previous to the passage of gas, and later of feces, from the urethra, or frequent and painful micturition may occur during the formation of adhesions and the general signs of a local inflammatory process may be present. Passage of gas is always the most constant symptom and may precede the passage of fecal matter through the urethra. Of course pneumaturia is not an invariable accompaniment of vesico-enteric fistula; all the material transmitted by the fistula may pass the other way and we may have clear urine and urinous stools. Indeed, the passage of urine per rectum is very common, and especially noticeable when the intestinal orifice is low in the large intestine. The urine in the intestine may cause a diphtheritic inflammation of the mucosa, giving rise to a constant diarrhea. The passage of gas into the bladder is rarely perceived, but in some cases it may give rise to an immediate desire to urinate. From the urethra it may be passed with wheezy or even with a loud noise; indeed, one patient described by Wegscheider, was nicknamed "die Luftschifferin" on that account. The quantity is variable, but the odor is generally fecal, unless, as in the case of Jewett, the opening into the intestine is very high. It generally appears at the end of micturition and is sometimes affected by the position of the patient, being passed only when he is in the erect position, etc. Fecal material passes with the urine in variable amounts, sometimes enough to form a slight granular sediment, sometimes in such mass that the urine has the appearance of thick soup. At other times the fecal material may form more solid masses or be forced through the urethra in cylindrical moulded lengths. Foreign bodies, such as bones, seeds, etc., sometimes pass through the urethra, causing great pain. Ascarides have been passed at intervals in some cases, notably that of Krachowizer, and thought to have been the cause of the fistula, but other authors have suggested that it is more probable that the ascarides merely took advantage of the already formed fistula. When the opening is high up in the intestine the intestinal contents, as they reach the bladder, may, as in the case of Jewett above referred to, be so little changed that the whole food of the patient can be recognized. The discharge of fecal matter through the bladder may be intermittent, ceasing for days at a time, or appearing only when the intestinal contents are fluid, as for example after a purge. The gas is, however, rather more constantly passed. Micturition may be frequent and painful although many patients have no pain whatever.

The stools are very frequently affected by the connection of the intestine with the bladder, there often being a continual diarrhea. In some cases a formed stool may be followed by a completely liquid one, the sphincter being able to retain the fluid which has reached the intestine, so that a large amount passes at once at stool, instead of a continual dribbling. The symptoms are fairly well illustrated by the following cases, which occurred lately at the Johns Hopkins Hospital:

Case 1.—Mrs C. A., aged 60, came complaining of the passage of gas and feces through the bladder. Her family history and early personal history throw no light on the present illness. In February, 1896, she began to have a pain in the lower abdomen; urine was thick, with a brown sediment, and very offensive for the first two months. Gas began to appear with the urine in June. In July, being constipated, she took licorice powder and the resulting movement passed through the bladder; was better then for a a time. In October she submitted to an operation for the cure of a suburethral abscess. For several months the passage of feces ceased. In April, 1897, it grew worse and she passed a great deal of feces and gas with the urine. In July the discharge ceased a little, gas occasionally present. In November had severe attacks of intestinal pain and passed from the bladder what she thought was its lining. Since November the discharge has been rather less up to January, 1898, when it grew worse again. The presence of gas in the bladder was associated with a continual desire to urinate—never was there any pain from distension, however. The gas was discharged with a loud sound easily heard by those in the room or even in the next room. It had a fecal odor. Sometimes some pain in the abdomen on passage of gas. Not much pain in urethra except when the suburethral abscess was present. Controlled the gas as she did the urine. Since January has passed a great deal of feces through the bladder, the amount being increased when the bowels do not move with sufficient frequency. The urine showed the presence of a brownish sediment containing striped muscle tissue, partly

digested vegetable shreds, starch, an egg of trichocephalus dispar, pus, granular and hyaline casts. Cultures and cover-slips showed the intestinal bacteria. The urine contained albumin and an increased amount of indican.

On administration of bismuth subnitrate by mouth the characteristic black crystals of bismuth sulphid appeared in the urine. So also injection of a blue solution per rectum colored the urine blue.

Cystoscopic examination of the bladder gave the following: A No. 11 speculum introduced and bladder expanded to 63 cm. from internal urethral orifice to posterior wall.

In the posterior hemisphere the capillaries are much increased, this increased capillary vascularity becoming more marked toward the base of the bladder, where there is a uniform rosy injection.

Irregular deposits of pus over the base of the bladder, which is deeply injected. A No. 13 speculum introduced and a calculus extracted with mouse-tooth forceps, together with two small bits. In posterior hemisphere on the left, at the junction of the upper and lower quadrants, is a puckered surface extending slightly crescentic upward (knee-chest position) with its canal directed upward and backward about 8x3 mm. The borders are deeply injected over an area about 3 to 5 mm., but beyond this the surrounding tissue is comparatively normal,

Right ureter is deeply injected around its orifice and almost exactly in the median line; the left ureter is displaced to the left. There is around the right ureteral orifice a membranous deposit almost pure white, and cover-slip from this showed it made up of short bacilli and pus cells.

Rectal mucosa normal.

At operation the sigmoid flexure of the colon was found adherent to the bladder at the vertex on the left side. Area of adhesion 2.5 mm. in diameter, free on all sides so that the finger can be hooked under it, lifting it from the pelvis.

The two organs carefully dissected apart, protecting the peritoneal cavity with gauze; fistula 2 mm. in diameter cut through. Vesical orifice brought together by means of interrupted catgut sutures making a line from above down and to the left 4 cm. long. Dense fibrous tissue was then cut off the rectum, and mucosa lining the fistula cut out, making the opening into the bowel about 2 cm. long, with shelving sides in healthy tissue, this also closed with interrupted silk sutures about 2 mm. apart. Salt solution irrigation of the peritoneal cavity. Abdomen closed without drainage. Bladder drained by retention catheter and occasionally washed out.

The patient made a perfect recovery, the urine clearing up at once and the passage of gas ceasing immediately. Convalescence has been uninterrupted.

Case 2.—Miss J., aged 57; admitted to the Johns Hopkins Hospital in November, 1890. Menses regular up to age of 48. At 42 had swelling of legs with vaginal hemorrhages; since age of 50 these have occurred at intervals. Have grown worse lately.

Right and left tubo-ovarian masses made out. Celiotomy was performed and the tubo-ovarian cyst on left side dug out of adhesions in lower part of pelvis. Cyst ruptured, discharging 30 c.c. of thick, sticky, mud-like substance. Right tube and ovary also removed; foul odor suggested an opening into bowel. Pus discharged from uterine cavity came from a tumor in the body of the uterus.

Patient recovered. In March, 1896, she was readmitted, complaining of general pelvic pain. Vaginal puncture was performed, evacuating dark fluid blood and clots from a sac between uterus and bladder, puncture being performed in front of the cervix.

She was then passing bubbles of air at the end of micturition and there was pus in the urine. Cystoscopic examination showed an orifice 1.5 mm. in diameter in the left lower quadrant of the posterior bladder wall, from which pus exuded; a sound was introduced about 1 cm. into this. In March, 1898, at age of 64, she consulted Dr. Cullen, who found on examining the bladder a slight injection around the trigone and a marked reddening above and to the left side; no opening could be made out, although bubbles of gas and particles of feces could be seen coming from the injected area. Injection of milk into the rectum appeared at once in the bladder. March 23 the abdomen was opened and the upper left side of the bladder found firmly attached to the rectum just at the pelvic brim. The adhesions were gradually separated and a firm cord 1.1 mm. in diameter found connecting the gut with the bladder. This was cut through at the expense of the bladder wall. The edges of the rectal opening were then turned in and the wound closed by two rows of mattrass sutures. Vesical opening similarly closed. The patient did well for twenty-four hours, but her weakness was such that she succumbed. There was no peritonitis nor hemorrhage.

In this case it is probable that the stump of the left tube had become adherent to the rectum after the removal of the appendages eight years before, and that in this way the bladder was drawn up snugly against the rectum. Adhesions soon formed, and the fistulous opening followed in the same way that a dermoid cyst may become infected from the intestine after adhesions have formed.

The diagnosis of the condition is generally easy. Passage of gas, together with fecal material, is practically pathognomonic of the existence of fistula, although the passage of gas alone is not so. The blackening of a silver sound in the bladder occurs also in those cases of hydro-thionuria described by Rosenstein, Scott and others, so that that test in showing the presence of sulphuretted hydrogen, does not necessarily demonstrate the presence of a fistula. Colored injections into the rectum or into the bladder have been used very frequently, and when they give positive results are important. The most useful of these solutions are those in which the coloring matter is in suspension, rather than solution, as some materials such as methylene blue are readily absorbed and secreted in the urine. Milk, suspension of carmine, prussian blue, etc., have been used. In other cases solution of some easily recognized chemical such as the salts of iron, have been injected and the urine appropriately tested. Exploration of the bladder by means of a sound does not give the certain results ascribed by some authors, but rectal examination is of extreme value in many cases. Chavannaz lays stress on the bimanual recto-abdominal palpation. Perhaps the most important of all is the direct cystoscopic examination either by means of the Nitze-Leiter cystoscope, or better by inflation of the bladder with air and direct examination with the vesical speculum, as was carried out in the cases just reported.

The gravity of the prognosis depends, to a great extent, on the etiology, position and size of the fistula. Generally speaking, those of traumatic origin much oftener terminate favorably than those of inflammatory origin; indeed, there are reported several cases of healing after a mere rest treatment. In the carcinomatous and tuberculous cases the mechanical results of the fistula are superadded to the effects of the primary disease. In the cases of intestinal stricture the prognosis is modified by the presence of the stricture, which limits the operative measures for the cure of the fistula. In many of the cases where the fistula is small and does not transmit a great deal of material to the bladder, the patient may live years in comfort; the passage of gas alone with the urine may go on for a very long while without any inconvenience, but when the opening is larger there is constant danger of obstruction of the urethra and choking of the bladder with feces; uremic symptoms may develop followed by death. Renal symptoms are comparatively rare when we consider the condition of the bladder. The formation of a sac in the course of the fistula between the bladder and intestine adds greatly to the gravity of the prognosis, as there is an accumulation with absorption of toxic substances.

Apart from the mechanical results the general health may be disturbed. When the fistula is high up nutrition is interfered with in so far as the contents of the upper intestine pass through the bladder instead of through the remaining intestine. Vomiting, fever, insomnia, symptoms of intoxication may appear and death may result from general exhaustion or from acute peritonitis.

Treatment is palliative or curative. Palliative

treatment consists in such general measures as promote the comfort of the patient by decreasing the amount of fecal discharge in the urine, and keeping the rectum and bladder washed clean. A rigid régime of food producing but little feces should be observed; the patient may be kept in a position such that gas only passes into the bladder. Iliac colostomy may be considered palliative; like enteroanastomosis, it has in some cases proved curative, as reported by Pennell, Holmes, Bryant and others.

Curative treatment is in most cases operative. The operations that may be performed in cases of vesico-rectal fistula are more numerous naturally than those suitable for fistulas into the intestine higher up. Briefly these methods are, as described by Chavannaz:

1. The rectal method in which the edges of the fistula are freshened and sutured through a speculum inserted into the rectum.

2. The transvesical, in which an extensive suprapubic cystotomy is done and the vesical orifice sewed up after freshening the edges, the sutures being knotted inside the bladder.

3. In the perineal method a dissection is made through a perineal wound, separating the rectum from the prostate and reaching the cul-de-sac; freshening and suture of the fistula is then carried out if practicable.

4. Resection of the sacrum with a gradual separation of the rectum has been advised.

5. The transpelvic operation with an incision through the pubes, or symphyseotomy and subsequent dissection backward.

6. Most satisfactory of all, both for intestinal and rectal fistulas in the hands of an experienced surgeon, is the transperitoneal method described in detailing the case of Mrs. A., although there are some cases where the fistulous tract is deeply sunk in the pelvis, where this method would be very difficult to apply.

LITERATURE.

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THE ASEPTIC ANIMAL SUTURE: ITS PLACE IN SURGERY.

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Modern surgical technic differs in such a marked degree from the methods of even a recent period, that it is not a wonder that great differences of opinion still exist in regard to many questions pertaining to the treatment of wounds. For the present, at least, certain conditions of fundamental type may be accepted as settled, so far as the theory, or ideal, aimed at is concerned; for example, a wound made in aseptic, well-vitalized tissues, and maintained aseptic will be followed by primary union. It is not my present purpose to discuss the methods for maintaining a wound aseptic only so far as pertains to its closure and subsequent protection.

In any considerable wound it is necessary to occlude blood vessels and rejoin the separated structures. This must be done by the use of ligatures and sutures. The material best adapted for this purpose is the subject of the present inquiry. The materials in use are, thread made from hemp, linen or silk, almost exclusively the latter; metallic sutures, iron, gold and silver; silkworm-gut, catgut, and the tendon of animals, especially that from the tail of the kangaroo.

The silk fiber, spun, twisted or braided in various sizes, is so manifestly superior to the vegetable fibers of cotton, hemp and linen, that only silk merits discussion. Silk has continued in more general use as a ligature for the following reasons: It is strong, is manufactured into a thread that is very smooth and even, can be readily sterilized by wet and dry heat, is comparatively cheap and easily obtained in any desired size. Until it was found possible to close and seal wounds without drainage, silk seemed the ideal material for ligatures and sutures. Then it was supposed necessary to remove both ligatures and sutures, no matter how applied. When it was shown to be unnecessary and even harmful to drain aseptic wounds, the inquiry naturally arose, can not some material be found for sutures which will remain in the tissues sufficiently long to serve the purpose of constriction or coaptation, and ultimately disappear under the influences of the vital processes of the surrounding structures?

So far as the ligation of the larger arteries is concerned the problem thus presented is by no means new. The most important of the original studies in this direction of an early type were conducted by Dr. H. G. Jameson of Baltimore, and his prize essay published in 1829, upon the closure of arteries in continuity by the use of the animal ligature is worthy of commendation as a contribution of the highest scientific importance. It is singular to note that many of the leading surgeons of this period accepted his teachings as of great value, and ligated arteries as Dr. Jameson directed, using for material, more commonly, carefully prepared strips of buckskin. These were experimented with, somewhat, by English surgeons and met the approval of even Sir Astley Cooper. The directions were explicit, to ligate so as to occlude, but not to devitalize the artery, cut short and leave the ligature in the deep part of the wound.

The list of experimental studies published by Dr. Jameson demonstrated that the result of such ligation in the calf, dog and sheep caused a permanent occlusion of the artery, that the foreign material was encapsulated by living cells, and that ultimately the ligature entirely disappeared, leaving in its place a permanent reinforcement of connective tissue.

However, all this valuable experience was lost and forgotten in the heated controversy over the so-called inflammatory processes in wounds, which promised a fruitless and endless discussion, until the masterly studies of Lord Lister demonstrated the cause of the same to be vital and extraneous. He naturally arrived at the theoretic conclusion that, in a non-infected wound, the vital processes would be ample to permit of the safe application of an absorbable ligature for the constriction of an artery. So far as I know, Mr. Lister was utterly ignorant of the demonstrations of Dr. Jameson referred to above, and as the laws of England at that time were so framed that studies upon the lower animals, even of such an important character, were not permitted, this great master was obliged to resort to France for the privilege of pursuing his investigations. His conclusions are almost identical with those of Dr. Jameson. He used for ligature material, however, catgut as furnished for musical instruments, steeping it in a strong carbolic solution in order to render it antiseptic.

So far as I am aware it had not occurred to any to make use of sutures deeply implanted in wounds, *buried*, until in 1870, when it became very evident to me that it was necessary for the purpose of curing hernia to close separately the different structures of

the abdominal wall and to restore the inguinal canal to its normal oblique direction.

Based upon the knowledge of the animal ligature left *in situ* about an artery, it seemed a logical deduction that this could be safely effected. I instituted at once a series of comparative studies in order to ascertain if such suturing was safe and trustworthy. My investigations proved conclusively that aseptic animal structures buried in well-vitalized tissues were surrounded by leucocytes, which, little by little, invaded the material used and pari-passu were themselves transformed into connective tissue-cells, taking in a considerable degree the shape and direction of the suture material. So noteworthy was this, that at first I was constrained to believe that the material itself became revitalized as a sort of graft, but more careful observations demonstrated that the foreign material disappeared by a process of absorption, leaving in its place a vitalized band of connective tissue, the resulting product of which, in certain conditions, proves to be of the greatest value, to-wit, where the integrity of the parts are liable to damage because of tension, e. g., as in hernia and all wounded structures subject to special mobility. It gradually became evident that a careful coaptation of wounded tissues could be safely made, thus avoiding pockets of blood or serum, and, as a consequence, do away with the use of drainage-tubes, then supposed absolutely essential.

The drainage-tube in *aseptic* wounds can be only a damage and used as the least of two evils, since so much of the wound as is occupied by the tube must necessarily be left open, and closed by processes of a much slower character, so-called secondary union. Again, too, it was soon demonstrated that, notwithstanding the extraordinary precautions taken in the use of antiseptic dressings, a considerable percentage of wounds in which the drainage-tube was used, although aseptic so far as operative measures were concerned, became septic from the introduction of infection along the canal of the drainage-tube, more commonly due to the ever-present bacteria pertaining to the skin.

One of the most interesting and profitable original studies made in the Johns Hopkins Hospital was the demonstration of the micrococcus pyogenes albus as the normal habitant of the dying epithelium of the skin and their causation of so-called stitch abscesses, when the suture included the skin. Now the deduction seemed clear that an aseptic wound to remain aseptic must be coaptated so that pockets can not develop for the undue accumulation of fluids; that the drainage-tube should be abandoned, and that even the skin itself should be closed by a sub-cuticular suture in order to avoid skin infection. Then it was apparent that in the devising of the sub-cuticular suture in order to avoid stitch abscesses I had acted wiser than I then knew, and that the ideal dressing should consist of an hermetic seal so absolute as to prevent the possibility of extraneous infection. This is found in collodion, the contractile preferred, to which is added a small percentage of iodoform, reinforced by a few fibers of absorbent cotton, which admirably accomplishes the purpose while it still further fixes and holds at rest the evenly coapted edges of the skin and minimizes the cicatricial line of repair. Oftentimes a cicatrix is traced with difficulty some weeks after the union of such a wound, a result, which upon certain parts of the body, for esthetic purposes is of the highest importance. Having worked out, by slow process of detail, the above conclusions and published[1] the results from time to time, I now thought it was of the first importance to demonstrate the kind of suture material best adapted for this purpose, viz., buried sutures.

Material.—Silk is manifestly unfitted, since, to say the least, when aseptically implanted in the tissues, it rarely, if ever, disappears by a process of absorption, and not seldom after a long period of discomfort, the structures rid themselves of it, attended with a considerable amount of suffering, with injury to the surrounding parts.

When silk sutures are buried, it is unquestionably better that the thread should be as fine as can be used with advantage. The sutures should be interrupted and few in number. Even thus carefully applied, it often happens that weeks or months afterward these sutures are thrown off by a process of proliferation, although the wound has been made and maintained aseptic.

Silk buried in portions of the body called into special activity is most likely to give trouble. So well established are the foregoing objections to buried silk sutures that a general inquiry has arisen, is it not possible to substitute something better in its place? Although metallic sutures were at one time in very general use, for manifest reasons they have been discarded, until now they are limited to a very narrow range of possibilities. (Where it is necessary to make a permanent fixation of the osseous structures, the wire suture has an advantage, and here it is intended to be permanently left. Even under these conditions, when cut short and buried beneath the soft tissues, wire is very likely to be a source of subsequent irritation.) Silk-worm gut is absorbable in such a slow degree that it can be classed as belonging to the non-absorbable material used for ligatures and sutures, and for this reason is almost as objectionable as wire. The use of wire and silk-worm gut as a buried suture has its advocates for the most part among those who do not feel that animal sutures have a durability sufficient to be trustworthy.

I am indebted to Dr. Charles P. Noble of Philadelphia for a recent reprint of an article entitled, "Remarks upon the Use of the Buried Permanent Suture in Abdominal Surgery," published December, 1896. In it he states, "the original and simple method of a through-and-through suture for the closure of the wound in celiotomy has been tried and found wanting, because of suppuration and subsequent hernia. That he has had no experience with the use of catgut or other absorbable material in the closure of the celiotomy wound, because of the unfortunate results reported from Germany." He quotes Winter, who reports 8 per cent. of hernias following the use of the buried catgut suture. He also refers to the experience of Dr. Schede of Hamburg, who has employed silver wire as a buried permanent suture in the closure of celiotomy wounds since May, 1887. He thinks the favorable opinion of Schede is borne out by the experience in the Johns Hopkins Hospital where silver wire has been in general use for a number of years, with a low percentage of suppuration

[1] A New Use of Carbolized Catgut Ligatures, Applied for the Cure of Hernia. Henry O. Marcy, M.D., Boston Med. Surg. Journal, November, 1881, p. 515.
The Radical Cure of Hernia by the Use of Carbolized Catgut Ligatures. Trans. Amer. Med. Association, Vol. 29, pp. 295-305, 1878.
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and few subsequent removals of the buried sutures. He also refers to the experience of Dr. Edebohls of New York, who for a considerable period used silk-worm gut as a buried suture in the closure of the abdominal wall. Dr. Edebohls reports that from 5 to 10 per cent. of all his sutures thus employed caused suppuration and were either discharged spontaneously or required removal in order to secure closure of the wound or suppurating sinuses. In his aseptic wounds where primary union had taken place, suppuration followed in some cases in a few weeks, in others after some months, and in one after two years and a half. On this account Dr. Edebohls now uses chromicised catgut instead of silk-worm gut.

Dr. Nobe's object in writing his article is to show that in his experience silk-worm gut has proved a safe and reliable means of closing celiotomy wounds. He states, "that he has closed two hundred and ninety-seven celiotomy wounds by the use of buried silk-worm gut sutures with only seven cases of suppuration and with satisfactory results in preventing hernia." He emphasizes the selection of fine gut which is boiled for half an hour before each operation. The sutures are not tied too tightly and the ends are cut as short as possible. He used catgut for the closure of the peritoneum, the fatty structures and the skin as a continuous suture.

Dr. William B. Coley of New York reports[2] in detail sixteen cases where silk, silk-worm gut and silver wire were used as buried sutures for the cure of hernia. In these not alone was the hernia not cured, but suppuration supervened, and the sutures had to be removed. Of the number, five were closed with silk-worm gut sutures. He reports from the recent work of Schimmellbusch, page 121: "It has more than once been observed that in primary closure of wounds by silk or silver wire, the ligature, at the beginning well imbedded in the tissues, after a long period of time becomes repelled and suppurates out. The imbedded silk or silver wire simply remains as a foreign body in the tissues, of which the organism endeavors to free itself as soon as a favorable opportunity presents." He also reports: "In two hundred and fifty cases of hernia operations in which I have used kangaroo tendon for buried sutures I have not had a single instance of sinus formation, and the percentage of primary union has been ninety-six per cent." . . . "The ideal suture, then, would be one that would hold the parts in apposition for eight or ten weeks and then disappear by absorption. In kangaroo tendon we have these conditions perfectly fulfilled. There has never been observed at the Hospital for Ruptured and Crippled a single case of delayed healing sinus when tendon or absorbable suture was used. Unless those who use and advocate silk, silk-worm gut or silver wire in hernia operations are able to present some advantages to offset the serious disadvantages that have been demonstrated, I believe these non-absorbable sutures should be entirely abandoned."

Chance furnished me the opportunity of being Lord Lister's first American pupil, and so great was my enthusiasm for the master that I accepted unquestionably his teachings of the value of catgut as a ligature. I prepared my own catgut ligatures for some years, according to his directions, and they were undoubtedly aseptic. It was not long, however, before infection followed the use of commercial catgut suture material which was obtained from the most reliable sources. This led me to investigate anew with painstaking care the animal structures which might be better suited for this purpose. I soon ascertained that catgut is necessarily faulty for two reasons, first, as the connective tissue sheath of the small intestine of the sheep, it must necessarily be separated from the other coats of intestine by maceration. This is in reality a process of bacterial putrefaction. The connective tissue sheath being more resistant to the putrefactive bacteria, remains less injured by it, and as a consequence can be removed entire, but it is necessarily damaged by the processes involved. When thus separated and cleaned, although appearing as a white sheath of uninjured connective tissue, it is everywhere teeming with bacteria, and the cement substance which holds the connective tissue cells in fixation has been damaged by their action and by the necessarily long-continued maceration. So far as I am able to learn, at this stage of the process in the manufacture of catgut no thought of the value of sterilization has been entertained and no effort made for its accomplishment. The second objection to catgut as a suture material is the disposition of the connective tissue fibers themselves. For the physiologic necessity of dilatation and contraction of the intestine these fibers cross each other in a direction oblique to its long axis. The intestinal sheath is divided into strips more or less narrow in order to produce the desired sizes. When wet, it is an elastic, flat band with irregular edges. This is twisted upon itself into a cord and dried and thus is manufactured the catgut of commerce (strings originally designed for musical instruments).

Such is the extraordinary strength of the connective tissue that even thus disposed, when dry, catgut is very strong, but every musician knows the great care he must exercise in keeping it dry and keyed to the proper tension point. When damp it soon becomes soft, elastic and unreliable. When catgut is compared with the connective tissue found in the tendons of animals, the illustration is not overdrawn to say that the differences are as great as would result from weaving silk into the finest fabric, cutting it diagonally into strips and twisting it for use as a fishing line. When dry, it is comparatively strong, but when wet, a soft, elastic, flat band takes the place of the well-made fishing line. The surgeon must remember that his buried suture is eyer wet since it is immersed in the fluids of the body. This is the reason that catgut swells so extraordinarily upon being soaked, that knots in catgut are unreliable, and the yielding of the ligature may be sufficient to prevent the closure of the enclosed artery. In the tendons of animals the connective tissue cells are disposed parallel to each other and held firmly in contact by the cement substance, which in the preparation of sutures should be injured as little as possible. Tendons should be taken from freshly killed animals and prepared so that infective decomposition never ensues. Their use as ligatures is not new. Paul Eve, the great surgeon of Tennessee, employed them in the ligation of vessels many years before Mr. Lister's study of the subject. He used the tendons of the deer, taken directly from the freshly killed animal.

However, the knowledge of the use of tendons for ligatures was unknown to me until after my first publications upon the subject. As the result of my investigation and research for good suture materials, I was

[2] New York Medical Journal, Feb. 29, 1891.

so convinced of their superiority that I contributed a paper upon the subject at the International Congress held in London in 1881. Tendons from the whale, the broad fascia of the back of the buffalo and moose (Indian thread) proved of about the same value as the long tendons from the leg of the moose, deer and caribou. Although less fatty they were little to be preferred to the tendons from the domestic animals. Good ligatures are comparatively easy to obtain from these sources, but suture material must be smooth, even, strong, fine and for a continuous suture, of considerable length to be of service.

After a prolonged research, I found that the tendons from the tail of a medium-sized kangaroo furnished a material which possessed all these requisites. The entire family of marsupials have the psoas muscle divided into fasciculi, each of which has its independent tendon, extending to the very extremity of the tail. These lie parallel to each other and are easily separated. In the larger kangaroo these tendons are not infrequently thirty inches long, but entirely too large for sutures. Many of them will split readily, but are never as strong or satisfactory as the whole tendon from a smaller animal. Much the larger amount of kangaroo tendon shipped for commercial purposes is naturally obtained from the larger species, since it is sold by the pound, and by far the greater portion of tendon in the market is consequently less valuable.

Good tendon is smooth, even, and of a tensile strength greater than silver wire of the same weight. It should be taken from freshly killed animals, quickly sun-dried, and kept dry during the period of shipment, and as a consequence, its sterilization is effected with much greater certainty and with less damage to the intercellular cement substance. The tendon from the variety called the Wallaby furnishes the best suture material, but so difficult is it to obtain first-class tendons, that out of a lot of one hundred and forty pounds recently sent me, scarcely twenty were of first quality.

Preparation and sterilization of catgut—The recognition of the advantages attendant upon the use of absorbable suture material has been so universal that a very great many different methods have been experimentally tried in order to furnish from catgut the so-called ideal suture. The very fact that so many different methods of preparation have been employed is an evidence that none of them have proved entirely satisfactory. Only recently Dr. Nicholas Senn[3] of Chicago, has given his experience in the preparation of catgut. He approves Hofmeister's method of preparing catgut by the use of formalin. With this the profession is already familiar. The catgut is rendered tense by winding it upon a glass plate and immersed from twelve to forty-eight hours in a 2 to 4 per cent. aqueous solution of formalin; then immersed in flowing water for twelve hours to free the gut of the formalin, boiled in water from fifteen to twenty minutes, hardened and preserved in absolute alcohol containing 5 per cent. of glycerin and 1/10 of 1 per cent. of bichlorid of mercury.

Dr. Senn modifies the foregoing method by preserving the formalin gut, after boiling it, in absolute alcohol 950 parts, glycerin 50, finely pulverized iodoform 100 parts. He considers the iodoform of value as a mild antiseptic, and that it diminishes the amount of primary wound secretion. He speaks of it only as a ligature, but I infer that he also uses it as a buried suture. He quotes from Nusbaum approvingly, "Catgut is without doubt Lister's greatest discovery," and states that he considers "the aseptic absorbable ligature as one of the greatest achievements of modern surgery." Dr. Ralph C. Larrabee of Boston in a recent article[4] gives an interesting review of the sterilization of catgut by boiling in alcohol. He quotes Lauenstein's investigations,[5] where, in a large series of cultures made for the purpose, he demonstrated quite a variety of micro-organisms as commonly present in catgut. Dr. Larrabee shows from his own experimental studies that boiling in 95 per cent. alcohol for one hour did not render the catgut sterile, and in each case he obtained cultures of a bacillus. Chemically, catgut contains water (23 per cent.) and fat (7.5 per cent.). By most of the recent processes of sterilization these substances must be removed. The remainder consists chiefly of collagen, which under the continued action of hot water is transformed into gelatin. Dr. Larrabee quotes the experiments of Saul, who found that if catgut was boiled in a 5 per cent. solution of carbolic acid in absolute alcohol, three hours were not enough to kill anthrax bacilli dried upon it. The addition of a small quantity of water gave much better results, since by using a 90 per cent. solution, instead of absolute alcohol, the bacilli were killed in ten minutes. Hofmeister has, however, found gut, after such boiling, contained staphylococci, which developed in proper culture media. As a result of Dr. Larrabee's investigations, he found that boiling the gut after Saul's method for fifteen minutes was sufficient to sterilize the smaller sizes, but, in forty experiments from the larger sizes, boiled from fifteen to thirty minutes, he obtained six cultures. He therefore concludes that it is necessary, in order to be absolutely sure of sterility, to boil the smaller sizes thirty minutes, the medium forty-five minutes; the largest sizes are safer boiled one hour. "Catgut thus prepared deteriorates by age, and whether preserved wet or dry, a certain per cent. of the actual strength is certainly lost."

Dr. R. M. Pearce reports[6] a series of careful studies of sterilization of catgut with formaldehyde. This he applied by vaporizing small amounts of the 40 per cent. solution (formalin) into a glass chamber in which the catgut was exposed. In every experiment sterilization was satisfactory, but the gut became so brittle that it was ruined. He shows that the injury occurred largely from the moisture necessarily contained in the vaporized formalin. He found that the gas in a dry condition gave a much better result and this he recommends as a practical method of sterilization: "Nothing is required but a wide-mouthed jar, some paraform pastilles, a piece of wire gauze or open-meshed cloth and a wide-mouthed bottle. A dozen pastilles are put in the bottom of the jar and covered with a piece of wire gauze to prevent actual contact with the gut. The pastilles yield a sufficient amount of gas for complete sterilization."

Dr. A. Goldspohn[7] of Chicago has contributed an interesting article upon the preparation of catgut by formalin and boiling. From a careful review of the experimental studies of a number of reliable investigators and a series of his own he deduces the follow-

[3] Journal of the American Medical Association, Dec. 12, 1896.

[4] Boston Medical and Surgical Journal, Jan. 28, 1897.

[5] Archiv. f. klin. Chirurg., 50, 323, 1895.

[6] Boston Medical and Surgical Journal, April 19, 1898.

[7] Reprint, Chicago Medical Recorder, Vol. xiii.

ing: "These facts being known we must not depend on formalin to sterilize catgut but simply to harden it so that it may be boiled *ad maximum*. That this maximum boiling of twenty minutes may be possible it is necessary to remove all excess of formalin from the gut by prolonged washing in running water previously. But the vexatious question is now settled that catgut can be certainly sterilized, for we can now boil it in water, the ideal menstruum, as long as the adherents of silk need or usually care to boil that, and the advantages of absorbable ligatures are too obvious to require further comment. However, there is one slight objection to catgut remaining, which arises from the ptomains which it may sometimes contain. On this subject Dr. Edmondo Orlandi in Turin published researches in 1895, and Professor Papfert of Giessen likewise toward the close of 1896. Both affirm the occurrence of slight or non-virulent suppuration limited to the immediate vicinity of the gut, not producing any systemic disturbance, and usually subsiding without any marked detriment locally. However, to avoid this objection partly, I am now having all catgut soaked in ether previously for forty-eight hours or more, to extract the fat, hoping also to get rid of some of the ptomains that may be present."

"My reasons for preferring catgut so prepared are, first and chiefly, because it stands the crucial culture tests that have been applied to it by its founders, which is not true of any former method, that of von Bergman not excepted, for Braatz cultivated anthrax spores of only moderate resistance in abundance from catgut prepared by that method. Secondly, because of the immense satisfaction to a surgeon derived from a knowledge of the supreme germicidal capacity of water boiling for twenty minutes. Thirdly, because this catgut is hardened enough to answer the purposes of chromicized catgut reasonably well without being too hard. From clinical observations my impression is that the smaller sizes hold from seven to ten days, while the larger sizes, as No. 6, used on pedicles, etc., hold for about fourteen days."

Formalin acts upon connective tissue in a way to change its ultimate cells and cement substance into a homogeneous mass of gelatinous character. Deformalized in running water for twenty-four hours and boiled loosely coiled in water, the gut or tendon swells immensely and shortens to about one-third its former length. It is fibular, elastic, a homogeneous translucent mass. If wound tightly on a small test tube and boiled shrinkage does not take place, but the other changes ensue and the tensile strength is much lessened. If catgut thus heated remains in the tissues only as long as Dr. Goldspohn has determined, its durability is much too little to be trustworthy for many operative purposes.

In the present status of the question, the views of those who have, for a time at least, discarded the use of catgut as an unreliable suture material must be held to be justifiable.

In the New York *Medical Journal*, Feb. 18, 1897, is an interesting article upon slowly absorbable antiseptic catgut, prepared by a modification of Boeckmann's method, by C. W. Borden, M.D., U. S. Army. He believes that the chief merit of the method is in rendering the suture material much more slowly absorbable by boiling it for an hour and a half in a 1/500 solution of mercuric bichlorid in alcohol. This antiseptic catgut has given, in his experience, most excellent results. He does not think the small amount of bichlorid of importance in producing irritation or wound secretion, and that it is readily disposed of in the tissues without injury. He believes there is as little danger of bichlorid irritation as of iodoform poisoning from using the formalized catgut soaked in an alcoholic solution of iodoform, recommended by Senn.

Dr. Borden thinks that it is of manifest advantage to add his method of making an antiseptic suture to that of Boeckmann, which consists in sterilization by dry heat. He considers that the formalin method of Hofmeister produces a catgut not in any way equal to that which he recommends. He thinks kangaroo tendon has been greatly overrated and attempts to show by an experimental study of a wound that it is far less resistant to the tissues than has been usually considered, and singularly believes it conclusive by giving a photograph of a frayed end of a kangaroo tendon suture emerging from the skin, "where it had been completely eaten through by leucocytes." Such examination teaches only the extraordinary rapidity with which the active proliferating processes supervene in the superficial layer of the skin, and this phenomenon has often been remarked upon in contradistinction to the processes which take place when the suture is buried in the tissues. The same process is observed uniformly, when the sutures are deeply taken through the mucous surfaces, as for example, the continuous over-and-over suture taken through the cervix of the uterus. Dr. Borden has taken the trouble to reproduce by micro-photographs the difference which followed the implantation of "unbichlorided kangaroo tendon and bichlorided catgut" in a septic wound, and shows that the tendon is less irritant than the catgut to disintegration changes. This should follow, if the bichlorid is of any value in preventing decomposition. He reports no attempt to show results where the catgut and kangaroo tendon, both of good quality and sterilized by the same method, have been aseptically buried in the same animal. Here, as I long since demonstrated, the contrast is most marked, and the results show that the tendon remains comparatively unchanged for a much longer period.

In the coaptation of the skin the subcuticular suture should be completely buried. The first end is fastened by a half knot, after the skin is penetrated. The stitch is taken parallel to the long axis of the wound, each succeeding stitch entering exactly opposite to the emergence of the previous one, and secured where the needle finally emerges through the skin by a half knot as at the beginning. This holds the edges in even, close coaptation. The ends of the suture are cut even with the skin, and slight tension in the long axis of the wound causes the ends to disappear below the surface (buried). It is then sealed with iodoform contractile collodion without drainage. The skin suture should be a fine one, and it is important to implant it only in the *deeper* layer of the skin, subcuticular; otherwise the skin may proliferate before absorption ensues and superficial abscesses follow.

Sterilization of tendon.—A small portion of the dried tendon is soaked for a considerable period in a warm solution of bichlorid of mercury (1-1000). When well softened the tendons are easily separable. Each individual tendon is laid straight upon a wet sublimated towel and allowed to dry. When dry they are assorted. In this state they may be used with comparative safety. I have never been able to

cultivate bacteria where culture tests have been made of tendons thus prepared. By reason of its histologic structure, as before explained, the tendon, when buried in the tissues, is much more slowly penetrated by the proliferative leucocytes than catgut. The effect of chromic acid upon the intercellular cement substance is extraordinary. It fixes it by a process of tanning and does not in any way interfere with its pliability, increases somewhat its tensile strength; causes it to absorb moisture more slowly and renders it much more resistant to the disintegrating influences, when buried in vitalized structures.

The tanning of certain grades of leather has been much improved by a somewhat similar use of chromic acid. The process is not only much shortened and cheapened, but the resultant product is very much more valuable. Recently, a large manufacturer showed me a goat skin thus tanned. It was not fine leather, but he said it would make a durable shoe, whereas under the old processes of tanning it would hardly be worth manufacturing. These methods are protected by patents and have already earned the owners over two millions of dollars. Chromic acid may be applied to the suture material in a strength which renders it unfit for use and makes it almost as slowly absorbable as silkworm gut. When properly chromicized, the suture should be of a light golden color and slightly translucent. It may be well preserved for an indefinite period in the dry state, but, as Lord Lister long ago pointed out, preserved in light-colored boiled linseed oil, to which 5 per cent. of carbolic acid has been added, it seems to keep indefinitely, and for a certain period, I think, is improved by age. When only partially immersed, as in a bottle half full of oil, the tendon becomes sticky and is greatly damaged. If replaced, after being removed, in a wet state, in the carbolized oil, the water in the tendon forms a sort of emulsion which speedily ruins it. It may be preserved in many of the different ways which have been recommended for catgut, and so far as I am aware I have tried them all. By none, however, has the product remained permanently as reliable as by the method just given. Kangaroo tendon prepared as above is objected to because of the trouble in preparation and its cost; trouble in that the oily product is difficult to seal after having been bottled, and the oil must be removed from the tendon before using. However, the latter is easily effected by immersing the sutures, just previous to use, in a warm sublimate solution for half an hour. I consider the antiseptic quality resulting from the remaining bichlorid beneficial rather than otherwise.

Is such tendon trustworthy and assuredly aseptic? Infective wounds, from a variety of causes, will follow in a small percentage of cases in the practice of every surgeon, but it is his imperative duty to exercise every possible care to prevent it. The sterilization by heat is considered absolute, hence instruments, towels, gauze, etc., may be assumed non-infective. The certainty of such knowledge, so far as suture material goes, is of equal importance, and hence the oft-repeated injunction, "trust no sutures that you have not personally prepared." By culture tests I have assured myself that the tendon is sterile and each of the various processes in its preparation is always conducted under my personal supervision. The query most often made is "What shall I do with the unused tendon that has been soaked in the bichlorid solution?" Wrapped in a sterilized towel, it should be sun-dried, and when thoroughly dry, replaced it in the carbolic oil for future use. Repeated treatment in this way leaves the tendon undamaged. For the last two years I have soaked the tendon for a considerable period in a solution of formalin, prior to its chromicization. This is a still further guarantee of disinfection.

Boiling in alcohol has been a favorite method with many surgeons for the disinfection of catgut. Sterilization of tendon may be effected by this method, but it renders it brittle, hard, and is much less satisfactory in its application. Dry heat is less damaging than by any other, except the above-mentioned chemical processes, and leaves a product more satisfactory than when boiled in alcohol. It is also perfectly easy of application by the simplest of all methods. There are two requisites, however, which are essential, the tendon must be entirely freed of the *oil* and *moisture*. A simple means of drying is to retain it for some hours in the sunshine, or in a warm oven. A coil of the dry tendon is placed in a large test-tube, with a dry cotton plug; over the end of the tube a rubber cap is securely tied. This is put in the sterilizer as long as it may be deemed desirable and thereby is known to be trustworthy. If only a very slight degree of moisture remains in the tendon, the resultant will be a compact mass of ruined material.

Tendon will bear repeated heating in this way with comparatively little damage, and it may be recommended as a safe means of assurance to the surgeon that any possible subsequent infection of the wound is not caused by his suture material. Kangaroo tendon sutures should be obtained at a cost of ten dollars per hundred, and so great has been the demand for it that I have had it prepared in quantity, under my personal supervision, for general use, which I fully believe is absolutely trustworthy and reliable. These sutures are coming into general use. I am constantly in receipt of letters reporting the great satisfaction following their employment; I have already quoted Dr. Coley. Dr. F. W. Longyear of Detroit says: "My experience has been entirely with this material, and has extended over a period of more than four and one-half years, during which time I have used it for both ligature and suture in fifty-seven cases of celiotomy, with and without drainage, and I have yet to see my first case of post-operative hernia where this material was employed."

Kangaroo tendon ligatures, ten or twelve inches in length, should cost less, since in the preparation of sutures which are long, fine, smooth and even, the larger part of the gross material is rejected.

It is quite difficult to obtain really fine sutures, and much placed upon the market is not of first quality. I have written the above description in careful detail, since there can be no question but that the use of the buried animal suture marks the greatest advance in the development of aseptic surgery. When applied in closing the abdominal wound by suturing the different layers independently, the skin also closed by a subcuticular continuous suture and the wound sealed with iodoform collodion, hernia is practically avoided. In over eight hundred aseptic laparotomies thus closed I have had but once subsequent hernia, and that in an extremely thin abdominal wall after the removal of a large uterine myoma. The cure of hernia by any of the so-called modern methods is dependent absolutely upon the use of buried sutures in closing the neck of the sac, reinforcing the weakened struc-

tures and the reconstruction of the obliquity of the inguinal canal, and it was for this very purpose I first employed animal sutures in 1870. With all the emphasis of an earnest conviction, I commend to every aseptic surgeon familiarization with the methods of wound closure by means of buried absorbable sutures, preferably tendon, and not alone predict their general adoption, but believe that in importance they hold the first place in the technic of modern aseptic wound treatment.

180 Commonwealth Avenue.

THE THERAPEUTICS AND SURGERY OF THE CEREBRO-SPINAL AXIS.

Presented to the Section on Surgery and Anatomy, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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It is safe to assert that the cerebro-spinal axis is the master-wheel for man's animal machinery. If the mainspring of a watch becomes interrupted in its integrity, the gearing throughout the entire structure becomes disturbed, its functions as a chronometer cease, and it stops. If the drivewheel of a locomotive engine be impaired, the functional activity of the great iron drudge is interfered with, and the creature must rest and be repaired before activity in function can be regained. If the centerpiece of the complicated machinery of a large manufactory becomes deficient or inoperative, the whole concern must shut down for repairs at any cost. In consequence of the dangers besetting mainsprings, drivewheels and centerpieces, extra protective measures are adopted for their continuous functional activity and uninterrupted security. In most cases an alternate or duplicate is provided that functionation may be assured.

The careful student of this piece of workmanship will have observed early in his work that the law of protection and compensation has been strictly obeyed by encasing the central nervous system in the cranial and spinal cavities in two symmetric halves, the one incasement in bony pieces, endurably immovable; the other in irregular blocks endowed with enduring possibilities, all lined with tough and resisting fibrous membrane of remarkable endurance, closely adherent to the inner surface of the bones and outer walls of cavities, and for the most part furnishing protective sheaths to the outgoing nerve trunks—adherence most marked where dangers are most threatened at the sutures within the skull, but secure throughout the entire extent of both cavities. This is familiarly known to anatomists as the dura mater, from its enduring qualities. Immediately surrounding the medullary mass and intimately investing it, is a delicate membrane composed of vascular netting, threads of which, large and small, penetrate the mass and form plexuses on the walls of the cavity within. This webbing of blood-vessels becomes plainly the nutrient mother of the system, and is hence called pia mater. Between the two maters hangs another membrane, delicate in its fibrous structure and somewhat adherent to both. Its suspensory, lubricating and protective functions are plainly in evidence. This is the arachnoid membrane, and it serves in a triple capacity.

Epitomized, the membranous structures of the axis may properly be stated to be: the dura mater, for protection; the arachnoid, for suspension and the accommodation of movement, and the pia mater, for the accomplishment of the essential act of life—its nutrition.

Between the maters is the arachnoidian space and membrane with communication throughout the entire extent of the axis. Another fact may be stated without argument. The cerebro-spinal axis is a hollow organ itself from end to end, and the vascular netting passes through and forms an anastomosis on the walls of the lumen. Schiff, Quincke, Leightheim, Fuerbringer and others have clearly demonstrated that lumbar puncture can be practiced with more or less impunity, and that, as a diagnostic measure, the operation is of great value, enabling the diagnostician to locate with accuracy the approximate position of certain pathologic processes in meningeal affections. The admitted impunity with which the procedure may be accomplished lends assurance of safety in establishing permanent fistulæ in the lumbar, dorsal, cervical, or even in the cranial regions, as is done in the various abdominal localities for establishment of artificial anus, so efficient in many surgical measures for the relief of disorders of the intestines. Because of the dangers from infection by perverted natural discharges from the intestines, the abdomen would be the more critical field to invade.

No more vitalizing agent has been created than oxygen, and no more active and unerring antiseptic agency has been, or ever will be, devised than ozone, which is electrically condensed oxygen. In all diseases of the central nervous system the first indication is to remove the inevitable pressure, whether from the effusion of blood or of serum or from bony environment, either from deformity or depressed bony spiculæ of traumatism, infection or vitiated nutrition.

The next move in the process of therapeutic procedure is to correct by every means at command this disturbed nutrition, which is constantly in evidence in all morbid processes. Direct medication is the modern advance in therapeutic procedures as illustrated in antisepsis. Through a permanent fistulous opening at any point throughout the extent of the cerebro-spinal axis may be injected safely and with facility, a stream of oxygen or ozone into the interior of the mass, and therefore brought to bear directly on the plexuses, and thence into as intimate relation with the floating column of corpuscles as in the air cells of the lungs, and doubtless with the same vitalizing effect, or the gaseous current may be directed into the arachnoidian space and thus be brought to bear in the same way and with equal efficiency on the vascular structure of the pia mater.

With a tissue as highly endowed with facilities for a constant supply of nutritive fluid as in the central nervous system, and charged with the all-important functions in evidence in it, a theory consigning it to be hopeless destruction and irretrievable ruin on every occasion when circumstances of traumatism or infection present is phenomenally absurd. Any part of the cerebro-spinal axis whose special function may be suspended for a sufficient length of time to afford rest and opportunity for a correction of interrupted nutrition may be safely invaded by the surgeon's knife, and repair as confidently expected as from mutilations in any other part of the body, with liberal margins in favor of the nerve mass and the bones entering into its encasements.

At the beginning of a great war with a foreign foe, whose chief historical characteristic is cruelty, and shaking from our national policies the isolations and

conservatisms of the past to become aggressively civilizing, if not, indeed, cosmopolitan or imperial, with all that these new national movements involve, I appeal to the science of surgery and the brilliant array of American operators on behalf of the human brain, the central nervous system, or the cerebro-spinal axis. I make this appeal the more earnestly, knowing as I do, that thousands of the flower and promise of our manhood must fall before the foes upon whom we must move in the sacred cause of humanity.

Modern warfare inflicts ten wounds about the head and face to one below the waist. The field for operative procedure and therapeutic study for the military surgeon is above the waist in large degree, and in this the head and face prevail over all others, and the reasons for this are plain, when we consider the manner of offense and defense. The military surgeon of today has opportunity long and wide for making himself an important factor in the march of the world in behalf of civilization and in the interests of humanity.

AN INQUIRY INTO THE NORMAL ANGLE OF JUNCTION OF THE NECK, WITH THE SHAFT OF THE FEMUR.

Presented to the Section on Surgery and Anatomy at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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In the examination of this subject, an effort has been made to confine the inquiry to specimens of the male bone fully developed, free from the results of injury or disease, and ranging in age as nearly as could be determined from twenty-five to forty years.

These extremes of age are selected arbitrarily, for between these periods of life the bone may be said to be at the height of its development—it has neither the deficiencies of incomplete growth or the defects of degeneration incident to age; it may be presumed therefore to be typical in all of its detail. As is well known, two angles are formed by the neck of the femur with the shaft of the bone, the upper being an acute angle, while the lower is an obtuse angle and gentle curve from the lower portions of the neck to the internal border of the shaft with which it becomes continuous. The arrangement of the bony fiber of the neck and the position of the neck itself upon the shaft is undoubtedly for minimizing the strain of the bodily weight above, in its transmission to the upper extremity of the bone below. These facts are now generally well recognized. It will also not have escaped the notice of the observer that the trochanter minor acts as an additional and powerful support to the neck of the femur upon its posterior and internal aspects, assisting greatly in transmitting the bodily weight. Again the perpendicular diameter of the base of the neck is greatly increased, as compared with the transverse measurements of the bone at the same place, also for the natural purpose, quite evidently of compensating for the change in direction of the strain of the bodily weight by increased strength and quantity of bony structure, the change in direction being from a perpendicular line to an angular line passing from the cup-shaped cotyloid cavity to the globe-shaped hemispherical upper extremity of the femur.

These circumstances, different in minor degree in different individuals, alter the angle of junction at the neck with the shaft somewhat, but in a way that makes it quite evident that there is a maximum and minimum degree of angularity between which extremes the angle of junction presented by any given specimen of the bone may be said to be normal.

In order to arrive at conclusions worthy of credence some definite method of anatomic measurement dependent upon fixed anatomic relations should be devised. When these relations varied in any given specimen of the bone which I examined, it was noticed that the angle of junction also varied in a like proportional degree, but always within the extremes of angularity above alluded to as probably being normal. In selecting specimens of the bone from which measurements were made for the purposes of this paper; those bones were chosen which presented on the anterior surface a large venous foramen—usually much larger than its neighbors—which was placed immediately below the spiral line and in a position which seemed to be the anatomic center of the shaft. Through this opening a perpendicular line was projected, which was also parallel to the axis of the shaft as nearly as could be determined. The position of the foramen in the specimens selected seemed also to be placed about one-sixth of an inch below the anatomic center of the neck of the bone, for the reason that a line projected through the center of the neck and representing its axis—as nearly as could be determined—intersected the line of the axis of the shaft at one-sixth of an inch above the foramen, thus establishing perhaps the true angles by which a bone should be measured. The two angles established are an upper acute and a lower obtuse angle. After establishing these angles and marking them upon the several bones examined by use of ink, they were carefully examined and measured with an angleometer, an instrument of precision for exact measurements of this character. In some twenty-five or thirty specimens examined—a number not sufficient to establish fixed rules, however—the minimum acute angle measured was 38 degrees, while the maximum acute angle was 52 degrees, the average angle being 47 degrees and 30 minutes, there being a few minutes less or additional as the case might be in many of the bones examined. When the place of the foramen varied from the position of one-sixth of an inch below the spiral line, but still maintained what seemed to be the anatomic centers of the neck and shaft with reference to that line, it was noticed that the acuity of the angle became less, thus if the foramen was placed at one-fifth or one-fourth of an inch below the line, the acuity of the lesser angle approached the minimum angle of 38 degrees, which has been named as the minimum angle noticed in this series of specimens. It is, of course, unnecessary to remark that the greater or obtuse angle is to be found by subtracting the measurements of the acute angle from the measurement of the axis of the shaft of the femur, which was assumed to be 180 degrees.

As is indicated by the title of this brief paper, its purpose is to record merely the results of an inquiry. The method adopted to attain these results is offered to the Section upon its merit for what it is worth.

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THE TREATMENT OF INOPERABLE SARCOMA WITH THE MIXED TOXINS OF ERYSIPELAS AND BACILLUS PRODIGIOSUS.

IMMEDIATE AND FINAL RESULTS IN ONE HUNDRED AND FORTY CASES.

Presented to the Section on Surgery and Anatomy, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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Three years ago, at a meeting of this body in Baltimore, a paper was read upon a similar subject by a distinguished surgeon. In that paper, based upon a personal experience of nine cases, three of which were carcinoma and a large proportion of the remainder types of sarcoma, which I had myself regarded as unfavorable, the broad generalization was made that the method was of no value, and the prophecy was ventured that in one year from that date it would be forgotten and buried in that oblivion that has furnished a quiet resting-place for so many of the brilliant cancer cures that have from time to time dotted the medical history of the past.

In the discussion of the paper I was rash enough to dissent from these conclusions, and in spite of the warnings and criticisms of the skeptics, I have steadily persevered along the same lines, and am here today to present the results of my work, leaving you to be the judges whether or not my labors have been in vain.

I have felt that the question was one that depended for its solution, not upon high authority or *a priori* arguments, but rather upon facts, derived from careful observation and large clinical experience. At that time I had treated eighty-four cases of inoperable malignant tumors with the mixed toxins; and no one could possibly have witnessed as I had, a considerable number of cases of hopelessly far advanced inoperable sarcoma, the diagnosis of which had been confirmed by the most skilled pathologists, entirely disappear under the injections of the mixed toxins, without being convinced that there was *something* of value in these toxins. It seemed to me that these successful cases, some of which at that time had remained well nearly three years, more than offset the many failures I myself as well as others had had. Moreover, it seemed reasonable to suppose that further investigation would enable us to improve the method as well as to ascertain just what types of tumor were most influenced by the toxins. Time will permit but a hasty review of the earlier cases already reported (*Am. Journal of Medical Sciences*, September, 1896), yet some review is of the utmost importance, since it is only by a study of the older cases that we are able to determine the permanence of the cure. With this end in view I have tabulated all of my cases of sarcoma, giving the final results as far as ascertainable.

I have decided in the present paper to confine my remarks almost entirely to sarcoma, and I have so decided for two reasons. The first and chief reason is to correct, if possible, the misunderstanding that I have found so common among men who have read the subject but casually, viz.: that the toxins are advised indiscriminately in all cases of inoperable cancer, whether sarcoma or carcinoma. Some excuse for this mistake may possibly be found in the titles of my former papers, yet a careful reading of the papers themselves, and especially the conclusions, will show that I have advised the toxins practically only in sarcoma and have stated that their use in carcinoma was, up to the time in question, largely experimental. I did state that I believed good results, similar to those obtained in sarcoma, would in time be obtained in carcinoma. While that time has not yet come, I can claim, I think, some reason for my belief in a few cases of carcinomatous nature attended with marked results. However, until this number has considerably increased, I think it wise to restrict the toxins to sarcoma, and it is needless to say, to inoperable sarcoma. I have never advised the treatment in cases of sarcomas amenable to operation, unless it be in a few cases where a brief period of treatment was advised with the idea of avoiding amputation of a limb. If the tumor be in the soft parts, and especially if spindle-celled, I believe it justifiable and even strongly to be advised to try to save the limb. I have now a patient who has been well nearly two and one-half years with rapidly recurrent spindle-celled sarcoma of the right hand, in which amputation of the arm would have been done had not the growth disappeared under the injections. I do not consider her cured, and shall not until she has gone beyond three years. Dr. L. L. McArthur of St. Luke's Hospital, Chicago, has had a case of recurrent spindle-celled sarcoma of the leg and a three times recurrent sarcoma of forearm, which disappeared under the toxins and made amputation unnecessary. Dr. John E. Owens of Chicago has also had a similar result in a case of round-celled myeloid sarcoma of tibia. All of these cases are well three years after treatment, and in three the diagnosis was confirmed by microscopic examination. I do not believe the chances of a cure by amputation are jeopardized by the short time necessary to determine the success or failure of the toxins. In cases of rapidly growing, small, round-celled sarcoma of the bone I would not advise the toxins, but immediate amputation. I have used the toxins in a few cases after primary operation as a prophylactic measure to lessen the chances of recurrence. Theoretically, this use of the toxins has much to recommend it, but my cases are as yet too few in number to warrant me in making any positive statements as to its value.

Method of preparing the toxins and technic of administration.—The preparation I have used the past three years is the same as described in my last paper, viz.: the mixed, unfiltered toxins of the streptococcus of erysipelas and the bacillus prodigiosus, made from cultures grown together in the same bouillon and sterilized by heating to 58 degrees C.; in children and patients much reduced in strength I have used the filtered toxins prepared by passing the mixed living cultures through a porcelain filter. This preparation is much weaker than the unfiltered, the relative strength of the two being about 1 : 10 or 15. The effect of the filtered solution upon the tumor is less marked than that produced by the unfiltered. The toxins used during the last five years have been prepared by Dr. B. H. Buxton of the Loomis Laboratory, New York. In the earlier cases the toxins were made from cultures of streptococcus of erysipelas obtained from a fatal case, but during the last three years a sufficiently high degree of virulence has been obtained by frequently passing the cultures through rabbits. Some of these cultures that had been passed through upward of sixty rabbits were experimented

with by Drs. W. H. Park and Alexander Lambert of the Board of Health Laboratory, and it was found that 1 c.c. of a bouillon culture reduced to one millionth part of its strength by dilution, was capable of killing a rabbit within twenty-four hours. This increase in virulence has been, I am convinced, a direct factor in the success of the toxins, and in fact, it was to increase the virulence of the erysipelas cultures that, in 1892, I first combined the bacillus prodigiosus with the streptococcus of erysipelas, Roger of Paris having proved that the latter germ had the power of making the streptococcus more virulent in rabbits, though as far as I know, it had never been used in the human body, nor had the combination ever been suggested in connection with the treatment of malignant tumors. I have never claimed to be the first to suggest the idea of substituting the toxins of erysipelas for the living cultures. Lassar of Berlin was, I think, the first to do this, in 1891, and Spronck of Utrecht, in October, 1892 (*Annals de l'Institute Pasteur*), reported twenty-six cases of carcinoma and sarcoma treated with a preparation of toxins of erysipelas prepared in the same way as Koch's tuberculin, but neither observer obtained a single complete success. Previous to Spronck's paper I had experimented with bouillon cultures of erysipelas heated to 100 degrees C., having been led to this by the marked improvement I had observed to follow repeated injections of living cultures, even when no erysipelas was produced. Dec. 12, 1892, I presented to the Surgical Section of the Academy of Medicine the results of repeated injections of living bouillon cultures of the streptococcus of erysipelas in ten cases of inoperable malignant tumors, and in this paper I stated that "In view of these results (my own), as well as those of Spronck, it may be considered definitely proven that a portion, if not all, of the benign influence of the toxins of erysipelas, rests in the toxic products rather than in the germ itself. The fact that thus far the results from an attack of erysipelas have been by far more brilliant and permanent, proves that either the germ itself or its continued action plays an important rôle, or, what is quite as probable, we have not yet learned how best to isolate the toxic principles and to use them in the most efficacious doses."

However much difference of opinion there may be as to the part the bacillus prodigiosus plays in causing the disappearance of sarcoma, and I am conscious that some claim it has no value at all, the fact remains that all of my own successes, as well as those of other surgeons, have been obtained with the combined toxins, and as far as I know, no one has recorded a successful case treated with the erysipelas toxins alone.

I have experimented in a large number of cases with the erysipelas toxins, at first alone, and later in combination with the bacillus prodigiosus, and I am quite convinced that the process of degeneration of tumor tissue is greatly increased by the prodigiosus toxin. Many opinions have been expressed as to the nature of this process, by means of which a cure is effected in the successful cases. The opinion which has been most generally advanced, though usually resting on theoretical, rather than practical knowledge, is that it is a simple necrosis or sloughing process resembling that following the injection of any powerful escharotic like carbolic acid; consequently it has been regarded as an entirely local process. Nothing could be farther from the truth. While in some cases of soft, round-celled sarcoma the rapid breaking down of the tumor would lend support to this view, there are many cases that absolutely disapprove its correctness. A number of cases of sarcoma have disappeared entirely by absorption with no breaking down, and furthermore, in several the injections were made remote from the tumor. This proves the action to be systemic as well as local. The toxins in some way, probably acting through the blood serum, cause a coagulation necrosis with fatty degeneration of tumor cells, the breaking down and formation of a slough depending entirely upon the preponderance of the cellular elements over the intercellular or fibrous stroma. In the spindle-celled variety, absorption without breaking down is the more common, while in the round-celled type, the reverse is true. Usually, when possible, I prefer to give the injections locally, for I have found the effect more rapid and more marked than when given subcutaneously and remote from the tumor. A much larger quantity can be safely given subcutaneously than when injected into the tumor, and this is a point of great practical importance. I have seen a severe chill and a temperature of 105½ follow the injection of one minim of the mixed unfiltered into a vascular sarcoma, when ten minims subcutaneously would have caused less reaction. In other words, the severity of the reaction depends largely upon the rapidity of absorption.

Dosage.—The rule should be to begin with a minimum dose and slowly increase each day until the desired reaction has been obtained. If this rule is carefully observed I believe the element of danger to be exceedingly small. It is evident that the dose depends largely upon the virulence of the cultures, and since it is extremely difficult to keep cultures of the same virulence the dose must vary within certain limits, and must be determined in the individual case by trial, the thermometer furnishing the guide. During the past two years the strength has been very uniform. Toxins produced from very virulent cultures, such as I am now using, mixed, unfiltered, should never be given in larger initial doses than one-half mimim or 0.32 c.c. Boiled water may be added to each dose to obtain the proper dilution. Each day the dose should be increased by one-half minim until the reaction temperature reaches 102 degrees or 103 degrees. The toxins may be used undiluted in doses of one minim or more, as this quantity can be carefully estimated with a well-constructed hypodermic syringe. If the injections are given subcutaneously, remote from the tumor, larger doses are borne, and in that case one minim can be given as the initial dose, and increased one minim daily. The amount required to produce a chill and temperature of 102 degrees or 103 degrees, varies with the individual case; one to two minims injected into the tumor will generally be sufficient. If the reaction is severe, the chill usually occurs within fifteen to twenty minutes of the injection. If the temperature following chill reaches 104 or 105 degrees, which is higher than one should aim to obtain, some stimulation with whisky and strychnin may be indicated. Nausea and vomiting usually occur in the severe reactions, but they are of short duration, and after one or two hours the temperature begins to fall and should reach normal within twelve hours. Following small doses, headache, slight muscular pains, especially in back, and a feeling of general malaise are the only symptoms observed, and these soon pass. It is unnecessary to

produce a chill after every injection; in fact, some of my successful cases had no more than four to five chills during the whole course of treatment. The aim should be not to cause too much depression, for in that case the patient is unable, for some time, to stand even small doses. Many of the successful cases steadily gained weight during the treatment, which disproves the statement of some writers that the treatment is exceedingly depressing and causes rapid emaciation. This may be true if the doses are too large, but not when the method is judiciously carried out. Strychnin may cause speedy death or act as an excellent tonic, according to the dose administered.

Aseptic precautions.—Inasmuch as the administration of these as well as other toxins undoubtedly increases the liability to infection if pathogenic germs are present, too great caution can not be exercised in sterilizing the hypodermic needle and the skin. If a tumor be ulcerated or broken down, great efforts should be made to keep the parts aseptic. Lack of such precautions has certainly been the cause of death in a number of the fatal cases.

Duration of treatment.—Fortunately it is possible in most cases to tell in a comparatively short time whether or not the toxins are likely to be effective. If no beneficial results are apparent after three weeks' treatment, I believe it useless to continue the injections. In nearly all of my successful cases marked improvement was seen within a week after the first injection, though final cure required, in some cases, several months of treatment. In one case, one of inoperable spindle-celled sarcoma of the abdominal wall, the tumor entirely disappeared under thirty injections and the patient is now well, one and one-half years later. The question of danger of long-continued injections of the toxins is an important one. One patient with thrice recurrent rapidly growing carcinoma of breast and axilla had the toxins steadily for two and one-half years. The doses were moderate, seldom producing a chill, and averaged two a week. The tumor has disappeared. The patient gained ten pounds in weight and her general health was perfect. The tumor finally recurred, ran a rapid course, causing death in six months.

Another case, an eight-times recurrent spindle-celled sarcoma of the chest wall (soft parts), has had the toxins with occasional intervals of rest for nearly four years. The disease has been kept almost completely in check by small doses of the filtered toxins and the treatment has not interfered with the duties of the patient, who is a well-known physician.

Macroscopic changes in the tumor.—The changes in the tumor that are first detected are: marked decrease in vascularity, loss of the smooth, glossy appearance of the overlying skin and later the presence of small wrinkles in the skin; the tumor soon becomes much more mobile and loosely attached. Marked decrease in size is often noticed within three or four days after treatment. Cessation of pain is in many cases caused by the treatment and anodynes which, though indispensable, before are no longer needed.

REVIEW OF IMPORTANT CASES ALREADY REPORTED, WITH SUBSEQUENT HISTORY.

Case 1.—Recurrent inoperable spindle-celled sarcoma of neck and tonsil, treated with injections of living cultures of erysipelas for four months. Well six years. Although this case was treated with repeated injections of living bouillon cultures of erysipelas and not the toxins the result was so remarkable that I may be pardoned for referring to it. The tumors nearly disappeared and the patient recovered his general health; well May 1897, six years later.

Case 2.—Recurrent sarcoma of back and groin, mixed-celled, round, oval and spindle. Male, aged 40. First treated on April, 1892, with repeated injections of living bouillon cultures of erysipelas. Entire disappearance; rapid recurrence two months later, final disappearance under the mixed toxins. Four more attacks of erysipelas artificially produced, and with less effect, in January 1893. The patient remained well three and one-fourth years, and in September, 1896, had an intra-abdominal recurrence in the retroperitoneal region. The tumor increased rapidly in size. In November, 1896, the patient became markedly jaundiced, but at the end of six weeks the jaundice disappeared and did not return. He gradually failed and died in April, 1897. Autopsy showed a large, hard tumor starting behind the posterior parietal peritoneum, pressing the viscera forward against the abdominal wall. The pathologic report of the original tumor made by Dr. Farquhar Ferguson of the New York Hospital was given in full in my last paper. It was a mixed-celled sarcoma, round, oval and spindle-celled.

Case 3.—Inoperable spindle-celled sarcoma of the abdominal wall and pelvis. Entire disappearance of the tumor under four months' treatment with the mixed filtered toxins; well at present, five years later. Patient male, aged 16, years, admitted to the New York Cancer Hospital in January, 1893, having been referred to me by Dr. L. Bolton Bangs as a totally inoperable sarcoma, the diagnosis having been confirmed by microscopic examination by Dr. H. T. Brooks, pathologist at the Post-Graduate Hospital. The entire tumor, 7 x 5 inches, completely disappeared and at my last examination made, May, 1898, the boy was in perfect health, free from recurrence, upward of five years.

Case 4.—Inoperable sarcoma of the abdominal wall. Entire disappearance under two and one-half months' treatment with the mixed toxins (filtered and unfiltered.) Patient is perfectly healthy at present, three and one-half years after treatment. The patient, a woman, aged 28 years, had had an exploratory laparotomy performed in August, 1893, at the Massachusetts General Hospital, by Dr. Maurice H. Richardson. A tumor was found involving such a large portion of the abdominal wall that removal was impossible; a portion was excised and pronounced spindle-celled sarcoma by the hospital pathologist, Dr. W. F. Whitney. She was referred to me in October, 1893, by Dr. Richardson. June 1, 1898, she was in perfect health with no sign of induration at the site of the tumor.

Case 5.—Spindle-celled sarcoma of the leg and popliteal region, three times recurrent; disappearance under the toxins; recurrence in the gluteal region after one and one-half years. Female aged 16 years. Further treatment with the toxins caused decrease in the size of the tumor until it was possible to remove it by operation. One year later signs of returning growth appeared in the popliteal space as well as in the stump of the leg. Amputation at the middle of the thigh was performed. Since the amputation the patient has been given injections from time to time with the filtered toxins with the idea of preventing a further recurrence. She is at present in good health, June 1, 1898.

Case 6.—Spindle-celled sarcoma of the scapula involving large part of left half of the thoracic wall. Entire disappearance of the tumor under three months treatment with the mixed unfiltered toxins; patient in perfect health, without recurrence, Jan. 22, 1898, four years later. As this is one of the most striking cases of success with the toxins, a brief abstract of the history will be given: The patient, a girl aged 16 years, was admitted to the New York Cancer Hospital June 20, 1894. The tumor had started in the left scapular region, four months before, and had grown very rapidly until the time of admission; the tumor measured 13 inches vertically behind and extended around beneath the axilla and to the sternum in front. The growth was fixed to the scapula and to the ribs, and probably originated in the soft parts over the scapula; it was about two inches in thickness in its most protuberant part, the skin over it being normal and perfectly movable. The left arm was bound down by the new growth so that it could scarcely be raised to a horizontal position. The mixed, unfiltered toxins were injected locally into the scapular portion of the tumor and continued with intervals of one to two days for nearly four months. Immediate and very striking improvement followed; at the end of three weeks the arm could be raised to a vertical position. After three months' treatment the tumor had entirely disappeared by absorption only, without breaking down. There was no evidence of inflammatory, tuberculous or specific disease. The diagnosis of spindle-celled sarcoma was moreover confirmed by careful microscopic examination by Dr. H. T. Brooks, pathologist to the Post-Graduate Hospital. This case was carefully examined by me June 23,

1898, and no evidence of return was found. General health perfect.

Case 7.—Intra-abdominal round-celled sarcoma, involving the omentum, colon and loop of small intestine and border of the liver. Exploratory laparotomy; diagnosis of round-celled sarcoma confirmed by microscopic examination by Dr. F. Schwyzer, pathologist to the German Hospital. This patient, a woman, aged 23 years, was operated upon by Dr. Willy Meyer at the German Hospital, August 16, 1894. Dr. Meyer stated that to remove the growth radically seemed impossible. He closed the abdominal wound and referred the patient to me for treatment with the mixed toxins. Treatment was begun in September, 1894; the injections were made sometimes into the abdomen, sometimes into the buttock. The treatment was kept up with occasional intervals until Feb. 7, 1895. The tumor mass which was distinctly felt at the time the treatment was begun, slowly decreased in size and June 25, 1896, no tumor could be felt. A sinus had persisted since Dr. Meyer's operation till March 4, 1896. Incision was made and the sinus traced into the gall bladder, and several calculi, one-half inch in diameter, tightly wedged in the cystic duct, were found; these were removed. The sinus still persists, but the condition of the patient when last seen, more than three years later, was that of perfect health.

Case 8.—Inoperable recurrent angiosarcoma of the breast, treated with erysipelas and prodigious serum, later by the mixed toxins. The patient, female, aged 59 years, had a three-times recurrent sarcoma of the left breast, of such size that operation was entirely out of question. She was admitted to the New York Cancer Hospital Jan. 20, 1895, and placed in the incurable ward. Physical examination showed a tumor occupying the region of the left breast extending from the anterior axillary line to the sternum, and from just below the clavicle nearly to the free border of the ribs; it was more or less fixed to the chest wall, and markedly protuberant. The patient's general condition was so bad that no attempt was made at first to give her the toxins; she was treated with small doses of erysipelas and prodigiosus serum, prepared by Dr. Buxton. The tumor slowly shrank in size and the patient's general condition improved; by September, 1895, the tumor had become so much reduced in size and was so loosely attached that it was easily excised under ether. Examination Jan. 30, 1896, showed the patient to be in good general condition with no evidence of recurrence. The diagnosis was confirmed by microscopic examination by Prof. T. M. Prudden of Columbia University, who pronounced it angiosarcoma round-celled.

Case 9.—Twice recurrent spindle-celled sarcoma of the palm of the hand; entire disappearance under two months' treatment. The patient, 20 years of age, had injured her right hand two years before. In July, 1895, a small swelling appeared in the palm of the right hand; in October, 1895, it had reached the size of a hickory nut and was removed. Speedy recurrence followed. A second operation was performed by Dr. Edward Martin of Philadelphia, on Jan. 2, 1896. Microscopic examination showed the tumor to be a spindle celled sarcoma. On Feb. 15, 1896, the patient was sent to me by Dr. Martin for trial with the toxins before resorting to amputation of the arm; the tumor had already recurred at that time at the site of the old cicatrix, 2½ inches long and 1½ inches wide; the mass was attached to the skin and firmly adherent to the tendons, but apparently did not involve the bony structures. The injections with the mixed toxins were begun on Feb. 15, 1896; the filtered preparation was used at first; later the unfiltered solution. The injections were made partly in the tumor itself, but the major portion were given subcutaneously in the arm. The treatment was given almost daily until March 30, when it was continued at her home by her brother, who is a physician. On May 15, 1896, the tumor had entirely disappeared and she was able to extend her fingers perfectly, 120 degrees having been the maximum extent to which she could straighten her fingers at the time the treatment was begun. She was presented to the New York Surgical Society for examination on May 27, 1896. The treatment with the filtered toxins has been kept up, with occasional intervals, to the present time, although in small doses, not sufficient to produce a chill. Not more than four chills were produced during the entire course of treatment. In October, 1896, there was a suspicion of glandular enlargement high up in the apex of the axilla. The patient was given ether, and a gland about the size of an olive was removed from the upper portion of the axilla near the clavicle. This gland was examined microscopically and was found to be distinctly sarcomatous, although it showed very marked degeneration. It may have been present when the treatment was begun, as it was very difficult to find it even at the time when removed. The patient at the present time, June 1, 1898, remains in perfect health. A slight thickening was noticed in palm February, 1898. This has yielded to further use of the toxins administered chiefly in the arm.

Case 10.—Recurrent spindle-celled sarcoma of the thigh and groin, entire disappearance under the toxins. M. S., female, aged 48 years. Family history negative. Five years ago the patient slipped and strained the muscles of the left thigh; three years ago a lump appeared at the outer aspect of the left thigh about the junction of the middle and lower thirds. This grew slowly. March 7, 1896, operation at the New York Hospital by Dr. Wm. T. Bull. A tumor the size of a fist was removed; but the large mass in the inguinal region was not interfered with, inasmuch as it was impossible to remove the entire tumor in the thigh. There was much edema in the whole leg and thigh.

Pathologist's Report: Copy of the records of the New York Hospital Pathological Laboratory: "The material is a piece of skin and subcutaneous tissue and masses of voluntary muscular tissue. The skin is circular in outline and measures 10 cm. in diameter; there are two tumors alongside of each other; the one measures 5 cm. in diameter, the other 4½ x 3 cm. In the deeper relations the lines of incision have gone very close if not through the tumor tissue. The larger tumor is soft and brittle and vascular; the smaller one is firm in consistence and whitish in color. Microscopically the structure of the tumor is that of spindle-celled sarcoma; the smaller tumor contains much more fibrous tissue."

The injections with the mixed, unfiltered toxins were begun at the New York Hospital, May 30, 1896, by Dr. Le Fetra, the house surgeon under my direction, and continued until June 15, every other day. Temperature reaction ranged between 101 and 103 degrees. There was a considerable diminution in the swelling; pain was less and the patient was able to walk upon the leg, which she could not do before. Examination June 16, 1896, shows a recent cicatrix, five inches long at the lower, outer aspect of the left thigh. The middle of the cicatrix, about one and one-half inch in width, had not entirely healed. In the region of cicatrix and to the outer side was an indurated mass, apparently the remains of the new growth. Measurement of the left leg four inches above the patella, was twenty-one inches. Right leg at the same point, sixteen inches. There was an ill-defined tumor in the left inguinal region; nothing could be felt in the pelvis. The swelling of the leg and thigh was much less than at the time of the injections were begun. The patient was admitted to the New York Cancer Hospital, and the injections were continued with occasional intervals of rest until September. At this time the tumor in the thigh and groin had entirely disappeared and the left leg had become normal in size.

Examination in January, 1897, showed no recurrence; measurement of the left leg the same as that of the right. In April, 1897, the left leg had begun to swell again and a small tumor was detected in the groin; induration of the old cicatrix also seemed slightly greater. The patient was again admitted to the New York Cancer Hospital, and the treatment resumed. At the end of three weeks the swelling of the leg has decreased considerably and the tumor in the groin has disappeared. The old cicatrix was removed and examined microscopically but no evidence of recurrence was found.

Case 11.—Spindle-celled sarcoma of iliac fossa, probably starting in the ilium. Mrs. D, aged 40 years, with a good family history in the early part of 1895 began to have sharp, stinging pains in the right iliac region. In May, 1895, she discovered a tumor in this region. This steadily increased in size, and on October 19, 1895, Dr. Johnston of Boston, performed an exploratory laparotomy. A tumor was found in the right iliac fossa about the size of a cocoa-nut, attached to the ilium as well as to the abdominal wall and totally inoperable. Its exact point of origin could not be made out, but from the exploration and subsequent examination I am convinced that it started from the inner portion of the crest of the ilium. A part of the tumor was excised and examined by Dr. William F. Whitney, pathologist to the Massachusetts General Hospital, who pronounced it "spindle-celled sarcoma." In November, 1895, the patient was treated with injections of the mixed unfiltered toxins (Buxton) by Dr. Farrar Cobb of Boston. In a letter Dr. Cobb states: "At the end of six weeks' treatment the growth has entirely disappeared."

On May 17, 1896, the patient came to me with a recurrence and entered the New York Cancer Hospital. Examination at that date showed a hard mass on the right side, extending from the crest of the ilium nearly to the level of the umbilicus and as far to the left as the median line. The tumor was apparently located in the ilium and abdominal wall. Her general health was excellent. The toxins were at once begun and continued with intervals of rest for three months. The outline of the tumor gradually receded toward the crest of the ilium, and

when she was discharged from the hospital the tumor was not more than one-fifth its original size when I commenced the treatment. She left with the understanding that she was to return in the fall and resume the injections. She was readmitted to the Hospital in November.

Examination showed the tumor to have increased considerably in size during the interval of rest, but on beginning the treatment the tumor at once began to shrink. Whenever the injections were made the patient noticed a peculiar burning feeling in the tumor, and this was true whether the injections were made into the abdominal wall or into the thigh. The abdominal wall was so thick with fat that few of the injections were made into the tumor itself. This patient was one of the very few I have seen in whom the toxins always produced very severe irritation in the skin. After each puncture a hard, indurated and very painful area the size of a half dollar would appear, and this would not pass away entirely for several days. When she left the hospital, June, 1897, the tumor had remarkedly decreased in size. When last heard from, December, 1897, she was still in good health.

Case 12.—Inoperable sarcoma of the sacrum; entire disappearance; perfect health three years later.—The patient, male, aged 38 years, enjoyed good health until February, 1895, when he began to lose flesh and strength. He suffered severe pain in the lower part of the spine over the region of the sacrum, shooting down to the legs, more marked upon the right. On April 1, 1895, he consulted Dr. W. C. Deming of Westchester. At that time he was beginning to be lame in the right leg; soon after the lameness extended to the left leg as well. These symptoms progressively increased; pain was acute. On May 2 he was sent by Dr. Deming to St. Luke's Hospital. His normal weight of 175 pounds had decreased to 134 pounds. He was so lame that it took him one hour to walk a distance of half a mile. He was admitted to Dr. Francis P. Kinnicutt's service, who on careful examination of the rectum found a tumor attached to the anterior portion of the sacrum, the lower border of which could be reached with the index finger, but not the upper. The tumor was of firm consistence and apparently started in the sacrum. The patient was emaciated and cachectic; his general appearance was strongly suggestive of malignant disease. The diagnosis of Dr. Kinnicutt and the other physicians and surgeons who saw him in consultation was: Inoperable sarcoma.

On May 10, the very day I returned from the meeting of this Association at Baltimore, I found a letter asking me to see the case in consultation with Dr. Kinnicutt with reference to the toxin treatment. My diagnosis agreed with that of Dr. Kinnicutt, but owing to the weakened condition of the patient and the inaccessibility of the tumor, making it necessary to give the injections remote from the tumor, I gave a bad prognosis, although I deemed it advisable to give the patient the benefit of a trial with the toxins for two or three weeks, advising, if no improvement occurred in that time, to discontinue the injections. The injections with the mixed, unfiltered toxins were begun at once, and made into the gluteal region; the treatment was repeated daily and at the end of one week the pain had almost entirely subsided and the lameness had markedly improved. The treatment was carried out at St. Luke's Hospital for six weeks and at the end of this time the improvement was so great that the patient returned to his home in Westchester and resumed his work. The injections were continued by Dr. Deming two or three times a week in the evening, after the patient had returned from his work. By the end of June, seven weeks after the treatment had been begun, the patient had gained twenty-eight pounds in weight, and stated that he felt as well as ever. Examination in the early part of July showed a decided decrease in the size of the tumor, and his lameness had entirely disappeared. On March 8, 1896, I again examined the patient and found him in perfect physical health and weighing 175 pounds. On rectal examination I was unable to detect any trace of the tumor remaining. October, 1897, I again examined this patient and found him absolutely well, without a trace of recurrence. Present weight, 175 pounds. He has had no treatment since the fall of 1895.

The report of this case I owe to the courtesy of Drs. Kinnicutt and Deming, who had personal charge, although the treatment was begun by myself and carried out under my direction.

Case 13.—Inoperable sarcoma of the iliac fossa. E. S., male, aged 14; family history negative. History of injury: One and one-half years ago was dragged under a trolley car which caused some contusions about pelvis. In January, 1895, the patient began to feel a pain in the right groin. In February, 1897, he noticed pain in the right hip joint and groin which was at first thought to be rheumatism. He rapidly lost flesh and strength and the hip joint became less and less movable, and early in March, 1897, the attending physician, Dr. G. H. Davis of Brooklyn, detected a tumor in the right iliac fossa, apparently starting from the ilium. The pain was exceedingly severe and constant. The tumor steadily increased in size and on March 27, 1897, he was taken to the Brooklyn Hospital and on March 29, exploratory laparotomy was performed by Dr. Geo. R. Fowler. A vascular tumor was found filling up the right iliac fossa, extending upwards about three inches above the crest of the ilium and Poupart's ligament. A diagnosis of sarcoma was made, and as it was clearly inoperable, the wound was closed and the parents were told that the case was entirely hopeless. The use of the erysipelas toxins was suggested as a last resort, but in view of the large size of the tumor and the weakened condition of the patient, little encouragement was given. The mixed, unfiltered toxins were begun in small doses on April 10, 1897. The injections were repeated daily with slowly increased doses; six minims were given before any decided reaction occurred. The injections were given in the gluteal region and not into the tumor. I first saw the patient in consultation with Dr. Davis on April 25, 1897. He had shown slight improvement since the injections were begun, but his condition at the time I saw him was so desperate that I gave a very bad prognosis. Physical examination at this time showed the patient extremely emaciated, with marked cachexia. His weight could not have been more than sixty pounds, his normal weight having been ninety pounds. The thigh was flexed on the abdomen to an angle of 120 degrees and motion was nearly absent; a hard tumor was felt in the right iliac fossa, extending upwards for about three inches above the crest of the ilium. The pulse was 130 and weak.

In spite of his apparently hopeless condition, I thought it wise for a short period to push the treatment to a point of obtaining marked reactions, and the dose was gradually increased up to 12 minims. At several times there was a well-marked chill with a temperature of 102-103 degrees following the injections. The improvement was immediate and rapid. I saw the patient again at the end of three weeks and to my astonishment found him walking about, able to straighten his leg and thigh completely. He had gained apparently no less than ten pounds and had a ravenous appetite. Examination of the abdomen showed that the tumor had almost entirely disappeared and now extended not more than a finger's breadth above Poupart's ligament. It is true that no microscopic examination was made by Dr. Fowler in this case, but the clinical history is so clear and striking that the diagnosis of sarcoma is scarcely open to reasonable doubt. The injections were *not* made into the tumor but into buttock and upper thigh. A few months later he developed a fluctuating swelling over the ilium behind. The skin became broken and slight infection occurred, causing some temperature. I incised the swelling, evacuating several ounces of degenerated tissue. No bare bone could be detected. The boy gained after the opening was made, but later the drainage became unsatisfactory and under ether I made a very free incision five inches long through the entire gluteal region down to the great trochanter; the original opening high up had not drained well and the discharge had produced an abscess cavity of some size lower down. The curettings and walls of cavity were most carefully examined by Dr. Buxton and not the slightest evidence of tuberculous disease could be found, practically verifying the diagnosis of sarcoma. The last operation was done April 10, 1898, and a few days ago (June 1, 1898) the patient's physician wrote me he had gained ten pounds and was feeling very well. The tumor in the iliac fossa has never recurred and the only probable explanation of the trouble in the gluteal region is, I think, that the softened and degenerated sarcomatous tissue worked backward along the line of least resistance and finally became infected. The primary tumor undoubtedly started in the ilium. This case has not yet been reported.

Case 14.—Recurrent round-celled sarcoma of the lip, treated with the mixed toxins.—A little girl, aged 5 years, daughter of a physician. Family history good. Personal history: First noticed a small spot, resembling a mosquito bite, on the right side of the lower lip, in September, 1896. About four weeks later it was removed by Dr. James R. Yocom of Tacoma, Wash. It was not regarded as malignant at that time, but the specimen was kept in alcohol. In October the growth began to reappear. Examination was then made of the specimen previously removed, and it was found to be round celled sarcoma. A much more extensive operation was immediately done, the entire thickness of the lip being removed, going widely beyond the scar and tumor. The tumor at that time was about the size of a pea and markedly indurated. A few weeks later it again occurred in the region of the scar. Feeling that further operation would be of little avail, the child was brought to me for treatment with the toxins. The tumor at that time involved the entire scar and extended from the mucous membrane of the lip downward

about one and one-half inches, and was increasing rapidly in size. The mixed toxins were begun Feb. 10, 1897, and injected into the tissues of the lip near the tumor and repeated in doses just sufficient to give her a slight reaction, but only once producing a chill. The filtered toxin was given except in two instances. The tumor tissue very soon lost its vascularity, began to shrink and to lose the glossy tense appearance. After four weeks' treatment, there was apparently very little of the tumor tissue remaining, but with a view of decreasing the chances of relapse, by removing any possible sarcomatous tissue that might be present, I decided to excise the entire scar tissue resulting from the previous operation. This was done by making the usual incision adopted in epithelioma of the lip, cutting about one-fourth inch beyond the scar tissue. The tissue removed was carefully examined microscopically by Dr. B. H. Buxton, assistant pathologist to the New York Cancer Hospital, and no sarcomatous elements could be found in any portion of the tissues removed. The child is still free from recurrence, August 1, 1898. The injections of the filtered toxins into the arm have been used with intervals of rest during the past year.

Case 15.—Spindle-celled sarcoma of the abdominal wall. Entire disappearance following thirty injections of the toxins. Patient well at present, one and one-half years afterward. M. S., female, aged 18 years, was admitted to the New York Cancer Hospital Dec. 29, 1896, with a tumor in the lower portion of the abdomen of several months' duration. Exploratory laparotomy was performed by Dr. Joseph Brettauer, assisted by Dr. George W. Jarmon, the attending gynecologist. A large mass was found in the abdominal wall, both intra- and extra-peritoneal, but it had no connection with any of the abdominal organs. It was regarded as inoperable and a portion was removed for examination and pronounced by the hospital pathologists, Drs. E. K. Dunham and B. H. Buxton, as a spindle celled sarcoma. The case was transferred to my service in order to have the toxin treatment tried. The first injection was made Jan. 19, 1897. The toxins used were prepared by Dr. Buxton from cultures of streptococcus that had been passed through fifty-five rabbits, thus attaining a very high degree of virulence. After thirty injections, the largest dose being six minims of the filtered toxins, the tumor had entirely disappeared. Very little pain and discomfort resulted from the treatment, and but four chills occurred the entire time. This case was shown in April, 1897, before the New York Surgical Society. The patient was reported perfectly well May 10, 1898.

Case 16.—Spindle-celled sarcoma of the parotid, twice recurrent, inoperable, successfully treated with the toxins.—W. L., aged 40 years, male, carpenter by occupation. Maternal aunt died of malignant tumor of the breast, which had developed as a result of an injury. In September, 1896, the patient received a slight injury to the left parotid region; the swelling was first noticed early in 1897. It continued to increase in size and in March, 1897, was removed by Dr. J. W. Wright of Bridgeport, Conn. A second and a third operation were performed in April, but the growth was found too extensive to admit of removal. Before the first operation the sub-maxillary glands on the same side had become involved. In July, 1897, the patient was treated for three weeks at the Bridgeport Hospital with the mixed toxins of erysipelas and bacillus prodigiosus, with but little improvement. Physical examination showed the tumor to be four inches in diameter, occupying the entire left parotid region, extending from the angle of the jaw to the orbit, from the external auditory meatus nearly to the angle of the mouth. The tumor was hard, firmly fixed to the deeper structures, with an ulcerated area at the center two inches in diameter; there was a second tumor the size of an English walnut in the sub-maxillary region. August 10, the patient was sent to me by Dr. Wright for further advice. Previous microscopic examination had proved the growth to be spindle-celled sarcoma, and this fact led me to advise further treatment. The patient was treated from August 10 to October 15, at the Post-Graduate Hospital, and being in very good physical condition, much larger doses than usual were administered and the injections were made daily most of the time. Although a chill generally followed the injections the patient was up and about the ward the entire time and lost no weight. A marked improvement was noted at the end of two weeks' treatment This improvement continued constantly until the middle of October, when there was no evidence of the disease remaining either in the face or neck. The patient was shown before the New York Surgical Society March 22, 1898, in perfect health, with no trace of the tumor remaining. He is still well, July 1, 1898. Two other successful cases (Dr. Johnson's and Dr. Storr's) of inoperable spindle-celled sarcoma, now well, one two and a half and the other four years, treated under my direction, will be found under cases of other surgeons.

Case 17.—Inoperable epithelioma of the chin, lower jaw and floor of mouth. The mixed toxins were used for four months. Entire disappearance. The patient well without recurrence four years afterward. This case has already been fully reported in a former paper. The patient was referred to me by Dr. Geo. R. Fowler of Brooklyn, who regarded it as entirely inoperable. Microscopic examination was made by Dr. William Belcher, pathologist of the Seney Hospital of Brooklyn. It is but fair to say that the microscopic examination was made from frozen sections and I wish to give due weight to whatever doubt there may be attached to the diagnosis. The fact remains that the operation proposed for the condition, by an eminent surgeon, was entire removal of the lower jaw, floor of mouth and portion of the tongue. In view of the dangers attached to this operation and the chances of a speedy recurrence, the surgeon advised against it. The tumor entirely disappeared under four months' treatment with the toxins and the patient continues well four years afterward.

Case 18.—Inoperable carcinoma of the breast. Three times recurrent. Constant treatment with the mixed toxins for two and one-fourth years. Disappearance of the tumor. Patient in good health until the end of this period when a local and general recurrence ensued. This case, although referred to in an earlier paper, has not yet been fully reported. The following is a brief history of it: Mrs. B., aged 40 years, first noticed a tumor in the right breast four years ago, developing shortly after an injury caused by a fall. First operation performed by Dr. Grupee of New York, in January, 1894. It consisted in a partial excision of the breast, the axilla not being opened. In the latter part of 1894 there was a well-marked recurrence, both in the breast and axilla. I operated upon the patient the second time at the New York Cancer Hospital in June, 1895. The conditions found being worse than I had expected, it was impossible to make a thorough removal of the diseased tissue. The glands were distinctly carcinomatous as far as the clavicle; the largest, the size of a large hickory nut, located high up in the axilla, completely surrounded the axillary vein and was so firmly adherent that it could not be removed without resecting the vein, which was not thought advisable. Hence only a palliative operation, consisting of the removal of the free glands and the remainder of the breast, was performed. Local recurrence took place in the center of the cicatrix before the wound had entirely healed and the disease progressed rapidly. The arm soon became swollen and the pectoral muscles showed marked infiltration. I decided to try the effects of the mixed toxins, expecting little more than a temporary retardation. Small doses seemed to have but little effect upon the tumor, but by larger doses the disease was controlled and even showed signs of retrogression; the swelling of the arm likewise improved. A few months later I gave the patient ether and excised the area of local recurrence in the neighborhood of the cicatrix, measuring two by three inches. This was firmly adherent to the periosteum of the ribs so that only a partial removal was possible. The disease quickly reappeared, but by increasing the doses of the toxins and the frequency of the injections, it was soon controlled and cicatrization of the carcinomatous ulcer slowly began to take place, and complete healing had occurred by January, 1896. The tumor in the axilla also decreased so much in size that it could no longer be felt. The infiltrated pectoral muscles became softer and practically normal to the touch. The right arm which, before the injections were begun, measured two inches more than the left, now showed a difference of but one-half inch. The patient had gained ten pounds in weight. The injections were continued in very small doses, one to three minims producing little or no reaction and in no way disturbing the patient in performing her ordinary duties. The patient continued well until the summer, 1897, when there was noticed a slight local recurrence in the pectoral region and shortly afterward an enlargement of the supra-clavicular glands. The toxins were left off for a period of five weeks, during which time the growth was most rapid. A few weeks later enlargement of the liver, jaundice, ascites and all the signs were noted. As early as July, 1897, slight twitchings of the left arm and face were noted; these gradually became more frequent and ended in partial paralysis. All the symptoms increased with great rapidity and the patient died in the early part of December, 1897. Microscopic examination of the tumor showed it to be a typical carcinoma.

The case is of much importance, since it shows that in certain cases at least the toxins do have a marked inhibitory action even upon carcinoma.

Case 19.—Recurrent double carcinoma of breast. This case is one of interest, as it shows that in certain conditions the toxins may be used to advantage in carcinoma, especially in conjunction with partial operation.

Mrs. W., aged 56 years, with decided family history of cancer, first noticed retraction of the left nipple three years ago. One year later she noticed a similar condition of the right breast. The first operation, double amputation of the breast, was performed by Dr. Maurice H. Richardson of Boston on Oct. 8, 1895. Recurrence was first noticed in June, 1896, in the form of small, pea like infiltrations in the skin. These increased in size until they formed a mass, three by four inches in diameter. Dr. Richardson advised against further operation and asked my opinion as to the use of the toxins. I stated that I believed the treatment would prove of only temporary value, and might have no effect. If the carcinomatous area could be removed surgically, I thought the toxins might have some influence in delaying a recurrence, although I did not believe they would prevent it altogether. With a clear understanding of these conditions, Dr. Richardson operated a second time on Nov. 27, 1896, and removed the area mentioned. On January 1, before the wound had entirely healed, new nodules appeared in the outlying skin near the anterior axillary line. The toxins, filtrate, were begun Jan. 10, 1897, and continued in small doses daily for one month. The small recurrence in the skin disappeared. The general condition of the patient, which was had at the beginning, remained about the same, but allowing a short interval of rest, her appetite improved and she felt much better than before the injections were given. The latter were resumed, this time by Dr. Richardson, and given three times a week, the dose being only 10 minims of the filtrate, which produced no chill, but only headache and slight malaise. The treatment has been continued in small doses with frequent intervals of rest up to the present time, June 1, 1898, or one and a half years. There have been four or five small sharply-localized skin infiltrations—the largest less than one-fourth of an inch in diameter. These have been removed under cocaine, and the patient is still well and in better health than at any time during the past year and a half.

(To be continued.)

A SURGICAL TREATMENT FOR HYPERTROPHIED PROSTATE AND HERNIA IN OLD MEN, WITH A REPORT OF TWENTY-EIGHT CASES.

Presented before the Section of Surgery and Anatony at the Forty-ninth Annual Meeting of the American Medical Association held at Denver, Colo., June 7-10, 1898.

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No class of patients is more worthy of the sympathy and careful attention of the physician than the unhappy victims of prostatic hypertrophy. To this malady is often added hernia, enterocele, with adhesions of the intestines, hernial sac and tunicæ, and not infrequently there is chronic hydrocele of the cord and multilocular cystic degeneration of the testicle. Already declining from the general organic dissolution of senility, these complications make them a class of patients difficult and unsatisfactory to treat. The constant appeals from this class of sufferers for relief from vesical pain and burning, rectal and vesical tenesmus, frequent and painful urination, retention of urine and its concomitant misery, has demanded of me more than passing notice.

The diseases of the prostate and bladder and their adnexa have been studied by many scientific men, and their researches have done much to mitigate the suffering of this class of patients. That there are still conditions which find no relief from palliative means of treatment, there is no doubt. The failure on the part of medicine in this direction has of late attracted the attention of the surgeon, and his efforts have not been without success.

It is the purpose of this paper to report some experimental work in the surgical treatment of enlarged prostate, as well as the radical cure for hernia in old men. I wish to impress upon your minds the fact that this radical means of treatment for these conditions was resorted to only after years of suffering and pauperism, and when all other sources of relief had repeatedly failed. I do not propose to discuss diseases of the prostate and bladder in general, and much of the clinical detail leading to a diagnosis calling for surgical treatment, is purposely omitted. The minutæ of examination and the detail technique of operations will be abbreviated as much as possible. An unusually large number of this class of patients have come under my observation the last two years, and I have made a careful study of each case, to try to determine the value of radical treatment, and the class of patients requiring it.

Frequency, Common Varieties and Results of Enlarged Prostate.—Sir Henry Thompson has observed that one-third of all men over fifty-five years of age have some enlargement of the prostate gland, and that a large per cent. of this number suffer from urinary disturbance as a consequence; that the onset is between the age of fifty-five and sixty years, and that it rarely comes on before this age, but may appear later. I am of the opinion that the onset, in many instances, is earlier than this, but does not manifest itself clinically until about this period, depending much upon the exciting cause.

The lateral lobes of the prostate may be greatly enlarged without evil consequences, but should they be so enlarged as to produce mechanical obstruction to the prostatic urethra, or the prostatic urethra itself be enlarged, however small, or as McGill has observed, a band of prostatic tissue be formed about the vesico-urethral portion, difficulty in urinating will result. These conditions, sooner or later, produce distortion of the prostatic urethra, elevation of the vesico-urethral orifice, and obstruction to the return of blood to the bladder. Later on, as a consequence of these changes, there will be dilatation of the bladder, fibroid degeneration of the prostatic sphincter, hypertrophy of the vesical walls, dilatation of the urethra, and renal pelvis, calculus formation and uremia. In some instances there may be prostatic enlargement without evil effects. But a slight pressure upon the prostatic urethra, or a slightly hypertrophied condition of this organ, may produce endless mischief, and yet be entirely overlooked by the physician.

Examination.—A digital examination per rectum should be made in every case where there is suspicion of prostatic disease, and a somewhat thorough knowledge of the diseases of the prostate and bladder is required. Strictures and vesical calculi must be constantly in mind. Palliative treatment should be faithfully tried, for many cases of supposed grave prostatic trouble yield readily to this form of treatment.

Symptoms.—In acute prostatitis there is frequent and painful urination, the pain and sometimes a few drops of blood coming at the close of the act. Distress in the perineum, radiating along the urethra and into the spermatic cords and sometimes down the thighs; rectal and vesical tenesmus and painful defecation. If there is a prostatic abscess forming there will be obstruction to the flow of urine, and, in extreme cases, retention, grave constitutional symptoms and throbbing pain in the perineum and bladder. Cystitis will be present, and on digital examination per rectum, pain and tenderness of the perineum and prostate will be elicited.

Chronic Prostatitis.—The symptoms are practically the same in this condition save in degree. There is usually a history of nocturnal pollutions, impairment of sexual function, pyuria and vague neuralgic pains in the pelvis.

Prostatic Hypertrophy.—In this condition there will be a history of difficulty in emptying the bladder, tardiness in the onset of the flow of urine, and lack of force. A sense of feeling that the bladder has not been emptied after urinating; fullness in the perineum and rectum, especially during and after stool, retention and enuresis, pain and prostration, cystitis and vesical and rectal tenesmus usually make up the clinical history. Stricture and vesical calculi call for a special examination. These symptoms are taken from the clinical history of the cases I shall report, and were commonly met with before a positive diagnosis was made. The patients making up the report have been inmates of the Cook County Infirmary for years, by reason of these infirmities, and represent but a fractional part of those still untreated among the fifteen hundred patients under my charge. I simply selected those suffering most, making a careful examination clinically, physically, and of the urine. They were then confined to bed, and a thorough line of palliative treatment, suitable to each, carried on for from two to three weeks, and sometimes much longer. I shall report them in classified groups, giving a detailed description of the first case of each group. This case will be illustrative of the group. The others are here reported but not read. The groups will be arranged according to the kind of hernia and the operations done. The treatment for all forms of enlarged prostate is the same, consisting of either gonangeiectomy or orchidectomy.

GROUP I.

Group 1 represents cases in which there was bilateral hernia with orchiocele on one side, in which orchidectomy was done upon that side and herniotomy and gonangeiectomy upon the other side. Two cases.

Case 1.—Aged 65, bed-ridden, emaciated, gastritis, constipation. Large direct inguinal hernia on right side, with an enormous orchiocele of thirty six years' duration. On left side was also a hernia, which occupied the scrotum, but was not so large or of so long duration as the one on the right side. Prostate gland was greatly enlarged; had had trouble in urinating for fifteen years; was confined to bed on account of retention of urine; suffered from pain in bladder and rectum; had cystitis and a large amount of residual urine; catheter required and passed with difficulty; was filthy from enuresis; peevish and irritable.

Treatment.—Medicinal treatment consisted of hot vesical douches twice daily of boric acid, nitrate of silver, 1-3000, or bichlorid of mercury 1-10,000. Laxatives, medicated suppositories for pain in rectum. Hot sitz baths, hot fomentations to the perineum and bladder, counter-irritation to the perineum, diluents for the urine, and "milking" of the prostate. This treatment was continued for three weeks, with negative results.

Surgical.—Chloroform anesthesia; incision on right side after Bassini's method; cord, testicle and hernial sac removed from scrotum in mass; cord separated and ligated high up; testicle removed; sac dissected out high up and ligated and stump dropped back into peritoneal cavity. The upper and inner portion of Poupart's ligament and the under and outer surfaces of the conjoined tendon and margin of the internal oblique were freshened with a sharp curette and formaldin catgut sutures, No. 3, introduced so as to draw the conjoined tendon and internal oblique above the conjoined tendon over Poupart's ligament, entirely closing the external ring and obliterating the canal. The external wound was closed with silkworm gut sutures and a wet bichlorid of mercury dressing of 1-2000 applied. Herniotomy, after Bassini, with resection of the vas deferens was done on the left side.

Subsequent history.—Recovery from operation uneventful. Wounds dressed and superficial sutures removed on the sixth day. Union by primary intention. No relief from prostatic trouble for three weeks, when gradual improvement began and continued until complete recovery six months after operation, patient having perfect control of urine, with a gain of fifty pounds in weight.

Case 2.—Aged 72 years. Had been an invalid in Cook County Infirmary for years, with bilateral hernia and prostatic enlargement. On right side was a very large hernia, occupying the scrotum. Same condition on left side, except in degree. Prostate greatly enlarged, with a long history of urinary disturbance, and catheter life. Prolonged treatment gave negative result.

Chloroform anesthesia.—Orchidectomy on right side and herniotomy and gonangeiectomy on left side. Recovery uneventful. Sutures removed on fifth day. Primary intention and relief from former distress in bladder after four weeks.

GROUP II.

Cases with bilateral hernia, with either bilateral chronic hydrocele of the cord, or bilateral cystic degeneration of the testicle, with bilateral orchidectomy. Three cases.

Case 1.—Aged 62. On right side was a hernia of fifty-nine years' duration, which was both congenital and acquired. On left side was a large scrotal hernia, of ten years duration. Prostatic urethra was plainly palpable and hard. Had enuresis and inability to empty bladder, excepting with catheter, for years. Had violent cystitis. Medical treatment negative.

Chloroform anesthesia.—Hernia on right side was found to be both congenital and acquired. The congenital sac—forming the tunica vaginalis was firmly adhered to the scrotum. There was hydrocele of the cord, and cystic degeneration of the testicle. Testicle was removed, true sac dissected out, and made into a tampon. Deep and superficial sutures, as usual. There being also chronic hydrocele of the cord and cystic degeneration of the testicle on left side, this testicle was also removed and the ordinary sutures and dressing applied. Wounds dressed and superficial sutures removed on the sixth day. Recovery entirely uneventful save for a slight attack of melancholia of one week's duration. No urinary symptoms after the fourteenth day. Has taken on flesh rapidly since operation, and is in good general health.

Case 2.—Aged 75. Had been an invalid in Cook County Infirmary since 1892. Had bilateral inguinal hernia with a very large orchiocele on right side. Had suffered for years from prostatic trouble. Had residual urine, and had to use catheter frequently. Medicinal treatment absolutely negative.

Chloroform anesthesia.—Owing to the thin abdominal wall on right side, and the very large opening, orchidectomy was done on this side. Left testicle was found to be cystic and was also removed. Sutures removed on the fourth day, and the patient began to get vesical relief in two weeks. Catheter was not passed after operation. Has had no mental symptoms. Is now entirely free from former prostatic trouble, and is a comfortable old man.

Case 3.—Aged 71. Right obliqne inguinal hernia, and chronic bilateral hydrocele of the cord of twenty years' duration. There was bilateral cystic degeneration of the testicles. On right side covering of cord and hernial sac were firmly adherent. Prostate was very much enlarged, and the patient had suffered for years from urinary trouble. Had been an inmate of the Cook County Infirmary at various times for years, and required frequent use of catheter. No relief could be had from medicinal treatment. The hydrocele had been tapped a great many times. Palliative treatment negative.

Chloroform anesthesia.—Both testicles removed. Union by primary intention. Convalescence entirely uneventful. No mental disturbance. After one month is free from former prostatic trouble, and in splendid general health.

GROUP III.

Cases with hernia and large enterocele and cystic testicle on one side, with castration on that side and gonangeiectomy on the other. Twelve cases.

Case 1.—Aged 82. Right inguinal hernia of fifteen years' duration. Hernia has been strangulated three times. Was filthy from enuresis. Prostate enormously enlarged and hard to the touch. Has had retention, at times requiring catheter. Chronic cystitis. Medical treatment negative.

Chloroform anesthesia.—Right testicle removed, and left was resected. Became confused mentally a few days after the operation, with delusion of wealth and power. Was exalted, sang and exhorted at night. Urinalysis showed albumin, for

which he was vigorously treated, resulting in almost instant relief from mental trouble. He began to improve at once, and made a splendid recovery. Three weeks after the operation he was taken by his daughter, at which time he was almost entirely free from his prostatic trouble.

Case 2.—Aged 64. Right complete inguinal hernia of thirty-nine years' duration. Right testicle was cystic. Hernial sac was divided into three pockets leading from a diverticulum. Sac was greatly adherent to tunicæ and scrotum. Prostate was enlarged and had trouble from his urine, from which he could get no relief. Catheter required to remove residual urine.

Chloroform anesthesia.—Right testicle was removed and gonangeiectomy done of left side. Primary union. Sutures removed on fifth day. Nine weeks after operation has no urinary trouble whatever. Is entirely well.

Case 3.—Aged 68. Strangulated left inguinal hernia. Was a suffer from prostatic hypertrophy, and during the operation for strangulated hernia, bilateral gonangeiectomy was done. Fifteen days after operation patient was up, and since then has been very well, and working hard for a farmer near the Institution. He thinks his bladder trouble was due to the "rupture."

Case 4.—Aged 75. Right oblique inguinal hernia of but one and one-half years' duration. Right testicle very much enlarged and cystic. Gives a history of urinary disturbance for years. Enlarged prostate. Has to use catheter at times. Medicinal treatment negative.

Chloroform anesthesia.—Right testicle removed, and left was resected. Made an uneventful recovery, and is entirely free from prostatic trouble, three months after operation.

Case 5.—Aged 61. Enormous right side inguinal hernia occupying the scrotum, and of thirty-five years' duration. Prostate enlarged, with urinary disturbance of a number of years. Residual urine drawn by catheter. Medical treatment gave negative result.

Chloroform anesthesia.—On incision the hernia was found to be both congenital and acquired. The true hernial sac was dissected away from that which enclosed the testicle and cord. An incision was made into the congenital sac and the cord was ligated and cut off. The upper portion of this sac was ligated and dropped back into the peritoneal cavity, while the lower portion and testicle were removed. The true hernial sac was returned above the ring as a tampon. The left vas was resected and in this case braided silk was used for the deep sutures. The external wounds healed by primary intention, but after two weeks a fistulous opening formed and the silk sutures had to be removed. This delayed convalescence. Six months after the operation there is no recurrence and patient is entirely well and free from prostatic trouble.

Case 6.—Aged 75. Had a large inguinal hernia on right side which extended into the scrotum. Was of a great many years' duration. Could not remember how long. Was suffering from retention and enuresis. Required frequent use of catheter to draw off residual urine. Medical treatment negative.

Chloroform anesthesia. On incision the hernia was found to be congenital. An incision was made into the congenital sac and cord ligated and cut away. Testicle removed. Acquired sac returned as tampon. Left vas resected. Recovery uneventful. Prostatic disturbance gradually disappeared, and is now in splendid general health five months after operation.

Case 7.—Aged 76. Right inguinal hernia of twenty-six years' duration. Prostatic urethra plainly palpable and very hard. Was suffering great agony from retention. Had had enuresis and general urinary wretchedness for years. Cystitis; catheter required. Medical treatment absolutely negative.

Chloroform anesthesia. Right testicle being cystic was removed. Left vas was resected. Recovery entirely uneventful and complete in one month.

Case 8.—Aged 61. Very large scrotal hernia of fourteen years' duration. Could not be reduced, owing to adhesion to scrotum, and of the intestines to the hernial sac. Was a good tailor, but was unable to work on account of pain from hernia and bladder trouble. Faithful palliative treatment negative.

Chloroform anesthesia. Incision down upon the sac. Adhesion between sac and scrotum broken up. Incision into the sac, and the intestines carefully separated, though leaving many raw surfaces. Intestines returned to peritoneal cavity and sac tied off. Cord ligated and testicle removed. The opening through the abdominal wall being so large three rows of sutures were put in, beginning with peritoneum, Poupart's ligament, internal oblique and conjoined tendon. Fascia of external oblique to margin of Poupart's ligament. Left vas was resected. The bowels were kept active with salines and the patient made a beautiful and uneventful recovery. Three weeks after operation was perfectly free from any of his former trouble and has resumed his work.

Case 9.—Aged 55. Incomplete right inguinal hernia, seven years' duration. Has had urinary disturbance for ten years. Large amount of residual urine, requiring use of catheter.

Chloroform anesthesia. Orchidectomy on right and gonangeiectomy on left side. Temperature normal after sixth day. Sutures removed on fifth day. Did not require catheter after operation and in two weeks began to get relief from urinary trouble. Recovery complete.

Case 10.—Aged 68 years. Right complete inguinal hernia and large enterocle, of forty years' duration. Has had urinary disturbance for almost forty years. Had attacks of retention. Is constantly affected with enuresis, pain in bladder and rectum. Had cystitis. Had been under medical treatment at times, for a year, and under special palliative treatment for three weeks, with negative result.

Chloroform anesthesia. Incision as after Bassini's method. An enormous sac was found to occupy the scrotum. There was also varicocele. Testicle removed. Sac dissected out high up and tied off. External inguinal opening completely closed with formaldin catgut sutures. Gonangeiectomy was done on left side. Union by primary intention. Sutures removed on fifth day. Six days after operation improvement in urinary trouble began, but even after this, there were times when patient was filthy. Temperature normal after fifth day, and six weeks after operation is entirely free from former trouble. Prostate atrophied and feels soft to touch. Left testicle also seems smaller.

Case 11.—Aged 72. Bilateral inguinal hernia, but much larger on the left side. Prostate enlarged. Urinary disturbance.

Chloroform anesthesia. Bassini's method was done on right side with gonangeiectomy. On left side there was found to be a large enterocele with intestines matted together and firmly adherent to sac and tunicæ. Testicle was cystic. Adhesions were broken up and intestines reduced. Orchidectomy was done. Recovery uneventful and seven weeks after operation is entirely well. Prostate is smaller and testicle on right side is also diminishing in size.

Case 12.—Aged 75. Left complete inguinal hernia of thirty year's duration. Enterocele, cystic testicle and chronic hydrocele. Enuresis. Prostate enlarged, residual urine and catheter.

Chloroform anesthesia. Orchidectomy on left side and gonangeiectomy on right. Convalescence entirely uneventful and one month after operation appears perfectly well. Taken from institution by his son five weeks after operation.

GROUP IV.

Cases in which herniotomy was done on one side, with bilateral gonangeiectomy, Fowler's method for hernia being used. Five cases.

Case 1.—Aged 60. Left inguinal hernia. Prostate greatly enlarged. Enuresis. Inability to control urine. Residual urine, requiring catheter. Burning pain in penis and bladder. Rectal tenesmus. Medicinal treatment negative.

Chloroform anesthesia.—Incision down upon the sac. Hernia found to be congenital. A circular incision was made around the sac and an incision laterally on upper portion of sac to internal ring. Cord drawn out of the sac through lateral incision and the sac ligated. Lower portion of sac left to form tunicæ for testicle. Then, after Fowler's method, an incision was made through the transversalis fascia up to the deep epigastric vein and artery. These were ligated and cut through. The cord with the vas was resected and cut ends touched with 95 per cent. carbolic acid; was dropped below the transversalis fascia and this fascia sutured over it. The remainder of the operation was done after the usual method. The right vas was resected. The time consumed in this operation was more than I generally take, owing to the herniotomy being done after Fowler's method, which is equivalent to doing a laparotomy. The patient made a good recovery, and was entirely relieved from his distressing urinary symptoms after three weeks.

Case 2.—Aged 66. Right inguinal, scrotal hernia of seventeen years' duration. Vesical and rectal distress from obstruction to prostatic urethra. Residual urine, requiring catheter. Medicinal treatment negative.

Chloroform anesthesia.—Fowler's operation and gonangeiectomy on right side, with gonangeiectomy on left side. Operation and subsequent condition a success. No urinary disturbance after six weeks.

Case 3.—Aged 65. Left inguinal hernia with a tendency to become strangulated. Was of three years' duration. Prostate greatly enlarged and nodular to touch. Was filthy and offensive from enuresis. Was a great sufferer from retention and residual urine, and cystitis. Had to be catheterized, which was difficult. Medical treatment was persisted in, but brought no relief.

Chloroform and ether anesthesia.—Herniotomy after Fowler's method was done, with bilateral gonangeiectomy. Patient became confused mentally after operation, and was very filthy and hard to manage. But after three weeks his mind cleared up somewhat and he was allowed to get up, after which he improved and, though suffering from senile dementia, is greatly improved as to urinary disturbance.

Case 4.—Aged 62. Right complete inguinal hernia of three years' duration. Suffered a great deal from prostatic trouble. Had cystitis and enuresis and at times retention. Catheter had to be used. Herniotomy after Fowler was done, with bilateral gonangeiectomy. Was up three weeks after operation, and is now entirely free from any of his former prostatic trouble.

Case 5.—Left direct inguinal hernia, of three years' duration. Prostatic hypertrophy with clinical history of two years' trouble, more aggravated at times. After failure from palliative treatment, Fowler's operation for hernia with bilateral gonangeiectomy was done. Result entirely satisfactory as to operation, and relief from vesical distress complete in nine weeks.

GROUP V.

Cases in which there was ventral and femoral hernia, with bilateral gonangeiectomy. Two cases.

Case 1.—Aged 63. Had a large ventral hernia in median line, about midway between umbilicus and symphysis pubis, of three years' duration. The tumor was pedunculated and could not be reduced. It made pressure upon the bladder, and was a constant source of irritation. The patient has been a long sufferer from prostatic hypertrophy, and was a constant sufferer from retention and use of catheter. An endless amount of treatment brought no relief.

Chloroform anesthesia.—An incision through the integument over the right lateral portion of the tumor revealed that the tumor was made up of omentum. The omentum was ligated off in sections and removed. The wound was closed by suturing separately the layers of the structures of the abdominal walls. Bilateral gonangeiectomy was done. The patient, being a syphilitic, made a tedious recovery. The wound suppurated, and patient was removed from surgical ward four days after operation. Eventually, however, he made a good recovery and became much more comfortable than before the operation. The result was not so satisfactory to me, from a surgical point of view, as the others I have done.

Case 2.—Aged 67. Had a large ventral hernia over site of former appendicitis operation; also a large femoral hernia on same side. He was anemic and despondent through failure to get relief from distressing symptoms of long duration, caused by enlarged prostatic urethra, which had always been diagnosed as a deep-seated stricture.

Chloroform anesthesia.—A long incision was made along outer surface of old cicatrix down to femoral opening. The hernial sac was then dissected out, beginning at the neck of the sac, which was ligated high up as possible and cut away. The falciform, crural and pectineal fasciæ, Poupart's and Gimbernat's ligaments were accurately approximated with No. 3 formalin catgut sutures. The ventral opening was also closed by carefully suturing the respective layers of the fascia and muscles with the same kind of sutures. The cicatrix was cut away, and the external wound closed with interrupted silkworm gut sutures. The result of this operation was perfect, the patient is greatly improved in every respect, as there was resection of both vas deferens.

GROUP VI.

Cases in which there was either bi- or unilateral hernia, with herniotomy and bilateral gonangiectomy. Three cases.

Case 1.—Aged 66 years. Bilateral hernia of twenty years' duration. Left hernia appeared first; had been strangulated; has had enuresia and vesical distress for three years.

Chloroform anesthesia.—Bassini's operation and gonangeiectomy on right side. On left side was an enormous enterocele with intestines firmly knotted together and to the hernial sac. The adhesions were separated and intestines reduced. Sac tied off high up and cut away. Gonangeiectomy was done on this side also. Patient took the anesthetic badly, requiring rapid operation. Sutures removed on fifth day after operating and temperature was normal at this time. Was up in three weeks, and five weeks after operation seems entirely well. Prostate diminished in size and testicle smaller.

Case 2.—Aged 64 years. Incomplete right inguinal hernia of eight years' duration. Has had urinary disturbance for seven years; enuresia, vesical pain and burning. Never had to use catheter.

Chloroform anesthesia.—Bassini's operation on right side with resection of two inches of vas. Gonangeiectomy on left side also. Recovery uneventful. Remained in bed four weeks, as his abdomen was pendulous and recurrence more liable. Five weeks after operation is entirely well. In this case, where the vas deferens was resected on left side, there has appeared a hard mass at each cut end of the vas the size of an acorn; is not painful and is easily movable.

Case 3.—Aged 73 years. Left side inguinal hernia of four months' duration. Has had enuresia and vesical distress for three years, also pain in the back, rectum and perineum. Residual urine, requiring use of catheter at times.

Chloroform anesthesia.—Bassini's operation on left side with bilateral gonangeiectomy. Six weeks after operation still complains of pain in the back, but is entirely free from urinary disturbance, except for slight burning after urination. Testicle somewhat smaller than at time of operation.

GROUP VII.

Case in which there was simple bilateral gonangeiectomy. One case.

Case 1.—History of difficult urination for three years, with enuresia, retention, frequent and painful urination, rectal and vesical tenesmus, residual urine and enlarged prostate. Catheter passed with the greatest difficulty and then with only the smallest size, the obstruction being in the prostatic urethra. Medical treatment negative.

Chloroform anesthesia.—Bilateral gonageiectomy of one and one-half inches of the vas deferens and patient walked from the operating room. There was no rise of temperature. Catheter was not required after operation, and in ten days patient began to get relief from former urinary disturbances.

1. All these cases were confined to bed, and a thorough line of palliative treatment carried on for from three to four weeks. If no benefit resulted from the palliative treatment, the patient was transferred to the surgical ward, when for two weeks before operation a stimulating diet with plenty of whisky and large doses of strychnia were administered. During this time the field of operation was carefully prepared with green soap, alcohol and bichlorid of mercury compress. The most rigid asepsis was followed through the preparation of the patient and the operation, with magnificent results in every case but one. The superficial sutures were always removed on from the fourth to the sixth day after the operation, and two dressings were all that were required.

2. Bassin's method for hernia was used in all but five cases. These were done after Fowler's method, which seems very surgical to me.

3. In cases where a large mass of the intestines occupied the scrotum, I returned them to the abdominal cavity three or four days prior to the operation. In some cases there were adhesions preventing the reduction.

4. No incisions were made into the scrotum in any case except into a small portion of the upper third, and even in cases of orchidectomy no drainage whatever was used. Hot sterilized salt solution of one dram of salt to a pint of water was used to control all oozings.

5. Chloroform anesthesia was used in all but one of these cases, and in this ether was substituted. Though old men with sclerotic arteries, and in many instances very feeble, no evil consequences resulted from operation.

6. Mental symptoms appeared in only three cases, and in these instances I believe they were due to the presence of albumin in the urine, as albumin was found which was not present before the operation, and when treated gave immediate relief to mental symptoms. I would caution all operators to look well to this suggestion, as in some reported cases acute

mania developed after bilateral gonangeiectomy. In a case related to me the mental trouble disappeared as soon as the albuminuria was treated.

7. No recurrence has taken place in any case of this series, and they have been followed up to this time.

8. In every one of these cases there has been complete relief from all former urinary disturbances, and the herniotomy has rendered the patient very much less helpless. Most of the operated cases were kept in bed for from a month to six weeks, with the hope that better organic union would result, and thereby lessen the liability to a recurrence.

9. From my experience I have no hesitancy in giving out the opinion that with proper study of the case for diagnosis, good preparation and rapid operating, this class of patients can be successfully treated for these grave maladies, with but little risk to life. And although it is a heroic treatment, it must be admitted by all who have had any experience with the treatment of this class of patients, it is warranted, in that it renders old men comfortable and less helpless than any other method of treatment. All of this series were grave cases of long duration, and although the best of preparation was made, the extreme age and feeble condition of many made it seem almost impossible for them to survive the operation. Yet not a single accident has occurred; and the results have been more than could be hoped for. The relief from distressing urinary disturbance has not been as immediate in any of these cases as in some reported; but no case has failed to be benefited, and in the most obstinate cases relief began to appear not later than the third week after operation. In cases where bilateral orchidectomy was done, the patient became almost obese and greatly improved in general health. In every case there was a diminution in the size of the prostate, and in the cases where gonangeiectomy was done, the testicle also became much diminished in size.

10. *Urinalysis.* In all the cases here reported pus was present in considerable quantity, and the reaction was alkalin, the reaction being taken as soon as the urine was voided. On standing, the pus settled in a sticky, viscid mass, which showed the cystitis to be of a chronic character. Blood and albumin were usually present in small quantities. The staphylococcus pyogenes aureus, albus and citreus, and the streptococcus pyogenes, as well as the bacillus coli communi were usually present. Vesical epithelium was also always found. The appearance of the urine was turbid and the odor ammoniacal, the sediment sticking to the graduate on standing. Previous to my service these patients had been in the habit of catheterizing themselves, and I have no doubt that this made their cases very much more aggravated.

11. In no case was the *libido sexualis* retained that I am aware of.

12. All cases should be given a thorough line of palliative treatment with confinement to bed. In this series, of those so treated, one in four required no surgical treatment.

RÉSUMÉ OF THE LITERATURE OF CASES OF ORCHIDECTOMY OR GONANGEIECTOMY IN CASES OF HYPERTROPHY OF THE PROSTATE.

Ramm,[1] of Christiania, Norway, was the first (?) to perform the operation of castration for the relief of hypertrophy of the prostate. He did the operation in April, 1893, and reported two cases.

Case 1.—Aged 73. Dysuria for fifteen years. Prostate was the size of an apple. The patient was catheterized for two years; urinated every hour, did not empty the bladder, and prostate was only over-ridden by catheter when two fingers were introduced into the rectum. The patient had advanced chronic cystitis. The urine was foul and contained blood. Three days after the operation the size of the prostate was diminished very materially, and at the end of some months the patient passed water twice at night, and three or four times during the day.

Case 2.—Aged 67. Sixteen years previously the patient was treated for retention of urine. Ten years later a suprapubic puncture was made for the relief of the retention. Before the operation the patient's bladder was distended nearly to the umbilicus, and catheter was passed with much difficulty. The night after operation he passed eighty c.c. of urine in a jet. Prostate diminished rapidly in size. Ten days after the patient passed water seventeen times in twenty-four hours, while two months after the operation he was compelled to urinate about five times a day, and once at night. The prostate felt soft.

Dr. Ramm summarizes his views as follows:

1. After castration of adults the prostate shrinks.

2. Hypertrophic prostrate shrinks after castration, beginning a few days after operation.

3. Shrinkage of volume of the prostate can be used after double castration as a means of removing the mechanical obstacle to urination. (*Centralblatt für Chirurgie*, Vol. 21, pp. 387-388.)

Haynes was the first in America to perform castration for the relief of hypertrophied prostrate.

Case 1.—Double castration in a case of prostatic hypertrophy where the symptoms lasted for two years. Eighty-four days after operation "the patient was actually cured."

Case 2.—Complicated by acute cystitis and morphin habit. Catheter inserted every two hours. Double castration. After operation cystitis disappeared and patient passed urine spontaneously. Use of catheter every five hours. Morphin habit also cured.

Case 3.—Patient operated on fourteen days prior to the time the case was reported. Catheterization was almost impossible owing to the abnormal development of the prostate. Result not stated. (New York *Med. Journ.*, 1895, Vol. 61, p. 584.)

M. Rochet remarks that castration for hypertrophy of the prostate may be considered as a barbarous method, and that deferent resection, simple or double, is far from having established proofs. (Lyons *Médical*, Janvier 2, 1898.)

Sir Henry Thompson says that one man of every three over 55 years of age, examined after death, showed some enlargement of the prostate; one out of every seven had some degree of obstruction present; while one in fifteen had sufficient enlargement to demand some form of treatment. In this country, according to the last census, there are more than three million men over 54 years, and of those, according to Thompson's estimate, about two hundred thousand are sufferers from hypertrophy of this gland. The classification of the remainder White arranges as follows:

1. The condition of the prostate as to size and density.

2. The amount of pain.

3. The amount and character of residual urine.

4. The frequency of catheterism and its ease or difficulty.

As secondary conditions, he notes: 1, the age; 2, the sexual power; 3, the conditions of the kidneys; 4, the general condition.

White divides the 200,000 cases into groups.

Group A, patients with moderate enlargement; little or no pain; clear residual urine to the extent of

[1] There is now no doubt that D. Francis L. Hayers was the first operator to do orchidectomy or gonangeiectomy for hypertrophied conditions of the prostate.

three or four ounces, and who never use catheter. If patient is not old, he retains sexual power; sound kidney; castration should not be considered.

Group B includes patients with large prostate the size of a lemon, with eight or ten ounces of residual urine, and with difficulty in the introduction of catheter. Then the choice lies between vasectomy, castration and prostatectomy.

Group C includes patients with prostate from the size of an orange to that of a base-ball. Cystitis is marked and the catheter introduced with difficulty. In these cases castration is preferred; also vasectomy may be first tried.

Group D, desperate cases, those in which the prostate is enormous, the cystitis excessive, the bladder dilated and atonied; retention; catheterization difficult, and occasionally impossible. Such patients are generally of advanced age and suffer from toxemia—a combination of uremia and sapremia.

Castration under these circumstances offers far more hope of benefit and less risk than any other operative procedure. In this class of cases the mortality is high.

As to the prospects of cure after operation, White says that in every thirteen cases of recovery, we should count upon eleven being complete cures. He states that clinical experience justifies the assertion that in a large proportion of cases (thus far in approximately 87.2 per cent.) rapid atrophy of the prostatic enlargement follows the operation; and that disappearance or lessening in degree of long standing cystitis (52 per cent.), more or less return of vesical contractility (66 per cent.), amelioration of the most troublesome symptoms (83 per cent.), and a return to local conditions not very far removed from normal (46.4 per cent.) may be expected in a considerable number of cases.

The mortality in castration is 18 per cent.; in vasectomy, 12 per cent. But it must be remembered that the patients in Class D, or worse, patients actually dying from uremia or sepsis, have been subjected to these operations. It is important to note that even in the desperate cases which make up the series of deaths, 75 per cent. showed improvement of symptoms or of shrinkage of the prostrate before death (*University Medical Magazine*, 1897, Vol. ix, p. 469).

(To be continued.)

SOME RECENT OBSERVATIONS UPON ACUTE INFLAMMATION OF THE PROSTATE GLAND.

Presented to the Section on Surgery and Anatomy at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY LISTON HOMER MONTGOMERY, M.D.

CHICAGO, ILL.

I selected my topic, even at the risk of promulgating but few new ideas and as well, no doubt, of going over much ground that you are already familiar with.

Anatomy of the gland.—In brief, the prostate gland in structure as well as in function is rather a muscle than a gland, composed chiefly of unstripped muscular fibers, and has an inner or circular layer which is continuous in front with those surrounding the membranous urethra and behind with the muscular coat of the bladder. The outer layer beneath the fibrous capsule forms a sheath for the gland, while beneath them the glandular structure is imbedded, or, according to Park, the prostate, its utricle; the dilated extremities of the vasa deferentia (called ampulla), and the seminal vesicles are, like the uterus and tubes of the female, enclosed in a thin fibrous sheath, which he has called the broad ligament of the male. The gland is divided into two lateral lobes by a deep sulcus or notch posteriorly and by a furrow at the upper and lower surfaces, while the so-called middle or third lobe, is the portion situated between the two lateral lobes at the under side and the weight of posterior part of the gland, adjacent to and beneath the neck of the bladder. The prostate in normal health is one-half ounce in weight and is about the size of an ordinary horse chestnut.

Varieties of inflammation.—There are two varieties of acute prostatitis—the follicular and the parenchymatous, either of which may be partial or complete as well as acute or chronic. Discussion of the latter grade of this disorder, however, does not come within the purview of this paper.

The follicular forms when resulting in abscess are rarely large, and almost invariably discharge themselves into the urethra, while the acute parenchymatous variety is more serious, because the entire substance of the gland is inflamed (as in a sort of cellulitis) and great disorganization may occur, involving the entire glandular and connective structures of this complex organ.

Etiology.—Acute prostatitis, whether it results in abscess of the gland or not, as is well known, may be due to trauma, or it may occur as an abscess—frequently does—elsewhere in the human economy, due to a probable remote predisposing cause, or due to causes wholly idiopathic in character. Among the latter may be enumerated a natural tendency toward a delicate constitution, which, when produced in an idiopathic manner, is not frequently seen.

The causes regarded as traumatic which may induce this disease not only include the incautious introduction of instruments; a contusion to the perineum, vesical and rectal tenesmus, obstinate constipation, formation of scybali and hemorrhoids with their incidental phenomena may also be a direct cause to bring on the disease. Gonorrheal infection, when unchecked and extending to the prostate, is almost invariably regarded as one of the most frequent exciting causes of the disease, as the tissues about the gland are a formidable soil for the growth of pus bacteria and its sequelæ.

The disease has been known as a complication in certain forms of acute febrile disease. It has been reported also as a sequel of smallpox, scarlet fever, typhoid and typhus fever. The various toxemias of infectious fevers produce venous stasis, which endangers the endothelium of the organ, or where there is a transudation in the blood vessels, as osmosis, or an altered condition of the blood which involves a malnutrition with nerve disturbances in the gland, or an altered blood plasma that results in congestion of the gland and prostatic plexus of veins may all be regarded as excitants to induce the disease; particularly is this true in old persons. Although doubtless extremely rare, infection from various forms of rectal disease, due to the propinquity or proximity of those parts, may be regarded as a possible exciting cause, notwithstanding the firm capsule of the gland. It would seemingly offer a sufficient obstacle and prevent the entrance of germs through that channel. On the theory of using instruments,

strong injections, horseback riding and, I have excellent reasons for believing that too much bicycle-riding will produce the disease, due to the rider assuming a false position on the saddle, or attributed to some possible faulty construction of the saddle, producing jolting, jarring, over-exertion, etc., resulting in irritation, congestion and disease of these vital structures. Sudden shocks about the perineum, induced in whatever manner, may be an exciting cause of this difficulty. Purulent or putrid cystitis, or pyelonephritis may also induce the follicular variety of the disease, although as has been stated hematogenous prostatitis is comparatively a rare disease. Should it occur, however, it would be expected to be due to a deficiency or reduction of oxyhemoglobin in the red corpuscles throughout the body.

Stricture of the urethra when long neglected may well be regarded as an active factor in exciting this disease, and some authors have said that a contracted meatus and phymosis are causes. If this be true, it is doubtless due on the same theory as stricture, namely, that at times of micturition a free exit of urine is not voided with the facility in which this act should be performed. Syphilis is said to be an exciting cause, and calculi, especially when retained in the bladder in the vicinity of the gland, is another exciting cause to produce inflammation of it.

Taking cold, which first induces congestion and subsequently is followed by inflammation of the gland, is also an exciting cause. Too frequent indulgence in alcoholic beverages and other causes that induce a sexual hyperemia followed by irritation or excitation of the gland, are doubtless true causes of a certain proportion of this distressing and sometimes serious malady. Excessive purgation is mentioned by Bumstead as a cause. Cantharides and other irritant drugs are cited as a cause by Loomis and Thompson. Senility doubtless is a contributory cause in a certain proportion of cases.

Urinary infiltration and frequent retention of the renal secretion, whether it is of an abnormally acid or alkalin reaction, may induce the trouble. On the other hand, the stream of urine is greatly diminished in size, or retention may occur and be due to the inflamed gland, or to an edematous condition of the gland or to infiltration of exudative matter around it (as will be stated later), to the formation of purulent matter within the prostate. Vasomotor disturbances that induce edema and hyperemia may cause inflammation of this gland; cellular exudation or serous exudation, especially in a neurotic subject, may induce either form of the disease in persons whom for want of a better term, I have denominated those who are prone to "idiopathic prostatic neurosis."

And lastly, I may mention that vague cause, "due to reflex disturbances," as a possible or probable one under certain conditions that would be likely to excite inflammatory action of the gland. Hypertrophy, atrophy, tubercle, malignant disease, etc., will not be considered as exciting causes of the disease in the strict sense and literary construction of the title of this paper.

Age.—Recent observation has led me to believe (according to my experience) that it is most frequently met with between the ages of 25 and 40 years, although as per the foregoing remarks, idiopathic or traumatic cases may supervene at any period of time after this limit, the former particularly, when the person afflicted is of a rheumatic or gouty diathesis.

Symptoms.—The symptoms that lead the surgeon to suspect inflammation of the prostate gland are the following: After eliciting a personal history of the case, and if the premonitory symptoms do not subside there is increased pain about the gland. There will be some difficulty in micturition and great pain experienced in bowel movement, often spasmodic in character when the patient tries to void his urine, accompanied by great distress and irritability of the neck of the bladder. Nervous chills followed by fever will give rise to strangury, and symptoms of a septic nature may supervene, in addition to which there will be nausea and restlessness. One of the early symptoms of the process of suppuration is a throbbing sensation accompanied by a dragging down weight and feeling of distention about the rectum, perineum, sacral region and neck of the bladder; this may extend to the lower part of the abdomen and suprapubic region as well as to the distal end of the glans penis and scrotum. There is also loss of appetite, constipation, a furred tongue, emaciation, anxious facies, despondency and dread of an operation.

Diagnosis.—In this it may be difficult to decide whether the disease is circumscribed and wholly of the gland, or whether it be periprostatitic in character.

Wyman says that "this affection is one which is entirely overlooked until it manifests itself by a gush of pus from the urethra or rectum, and rarely into the cavity of the perineum." Ziegler says "inflammation of the prostate gland is often associated with inflammation of other parts of the urogenital system, such as gonorrheal urethritis, purulent or putrid cystitis, etc, and that hemtaogenous prostatitis is rare." A digital examination (*tactus eruditus*) per rectum or manipulation bi-manually, will disclose that the gland is excessively sensitive and much enlarged. The anterior wall of the gland or its corporeal portion projects or is pushed into the bowel. If the feces are inspissated, defecation is most distressing, and so acute is this that the pain radiates along the hypogastric plexus of nerves.

Prognosis is usually favorable, as the disease in the majority of cases will result in recovery, either as a result of resolution or suppurative process with spontaneous discharge into the urethra or rectum, or in a few instances that I have seen, by both of these channels. Occasionally death will ensue through the intervention of sepsis, subsequently, if a morbid condition of the gland remain. Such defect must be ascertained, then, if possible, corrected.

Treatment.—In general the patient should be confined to bed and placed upon a milk diet; early application of leeches to unload the engorged prostatic plexus of veins, and hot fomentations to the perineum followed by free evacuations of the bowels with saline aperients. Copious draughts of demulcent drinks to dilute the urine should be administered. Hot hip baths, twice or thrice daily, should be given, although Wyeth recommends that "ice bags applied to the perineum will be found agreeable and of value," and that "suprapubic aspiration may be demanded in severe cases."

On the other hand, DaCosta says, "adjust hot sandbags to the perineum and hypogastrium." If the abscess has burst into the urethra and the stream of urine is very small, it may be necessary to introduce by most gentle methods a soft india rubber catheter, well oiled. Do not use metallic catheters if you can avoid doing so, and at as early a period as possible

dispense with all kind of catheterization. A gentle massage process to favor the discharge of pus is indicated in certain cases. If shreds of mucus casts collect, compared to croupous exudation as stated by Van Buren and Keys, and are cast off per uretheram, do not mistake these for spermatorrhea.

Enough anodyne and hypnotic remedies should be administered per orem or in suppositories to assuage pain, and if a soft catheter should have to be resorted to and the pain is excruciating, this can be facilitated under local anesthesia, and in a few instances if stricture is present, electrolysis to dilate the urethra may be found necessary.

My plan consists primarily, after ascertaining by examination, if suppuration has occurred, if possible, in washing out the abscess cavity with hydrogen peroxid to favor the exit of discharge. In no instance do I retain a drainage tube *in situ*, as it retards the closure of the fistulous opening. This is followed by a copious enema of as hot water as can be well borne and injected into the rectum. Hot hip baths at a temperature of 105 degrees F. to 110 degrees F. should be given as frequently as seem agreeable to the feelings of the patient. Avoid administering morphin internally if you can. Do not permit the patient to strain at stool nor while he is voiding his urine, as this will surely aggravate the symptoms.

On the theory, as above stated, that toxins are retained in the circulation and within the gland, and the disease, when it continues, acts on the nervous system, intricate microscopic changes having occurred, and with the view of preventing degeneration in the gland substance, I administer freely *triticum repens* or fluid extract of tritipalm as a genito-urinary tonic in combination with infusion of gum arabic or flaxseed. Along with these remedies the mineral waters, particularly Vichy and citrate of potash, go well together. Hydrate of chloral or this salt combined with the alkalines of antikamnia and the bromids are the very best anodyne remedies to control pain and spasms of the neck of the bladder. These pharmacologic or medicinal remedies are the most logical to use in my judgment, while externally, applications of antiphlogistine, inunctions of a 10 or 20 per cent. of iodoform, lanoline preparation, as well as of mercury, are also of much value.

I have also resorted to the internal administration of fluid extract secale cornutii, alternated with iodid of potash, with the view to restore contractility of the gland and to favor absorption of the plastic material deposited in it. The application of electricity and of the galvano-farradic current to the prostatic urethra may be tried to obtain similar results.

Secondly and lastly; a cheerful prognosis should be given to the patient, as well as substantial general tonics that are readily assimilated and will be most likely to produce metabolic action, are indicated to bring about complete convalescence.

If time permitted, I would recite the histories of several interesting cases in detail, but I am well aware that the Section know these general ideas find characteristics without my taking further time to do so.

Weighing in Tuberculosis.—Wolff-Immermann calls attention to the benefits to be derived from systematic, accurate weighing in the treatment of tuberculosis. He considers the scales as important as the thermometer. The average gain in weight in his sanitarium, Reiboldsgrün, is 360 grams a week, without over-feeding or remaining in bed. He advocates appropriate exercise.—*Munich Med. Woch.*, June 21 and 28.

VENTRAL HERNIA AFTER APPENDECTOMY.

Presented to the Section on Surgery and Anatomy, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo, June 7-10, 1898.

BY M. M. JOHNSON, M.D.

HARTFORD, CONN.

The immediate consideration in appendectomy is the saving of life and the restoration to health of the individual patient. Many operations with a faulty technique have accomplished this. The remote consideration is the integrity of the abdominal wall. This necessitates a careful consideration of the operative technique and the avoidance of many unnecessary procedures in the after-treatment which interfere with the closing of the wound.

The frequency of ventral hernia after appendectomy is inferred from the fact that fifty cases referrable to this cause, were observed at the Hospital for the Ruptured and Crippled, in New York City, in two years. (Coley.) A still greater evidence is the great demand for trusses and supporters of the various kinds by those upon whom the operation has been performed.

Incisions.—There are seven well-recognized incisions: The V-shaped; the L-shaped; the T-shaped; the obtuse angle; the long straight; the short straight; and McBerney's well-known incision, where the different layers are cut at different angles. These may be classified as the *long* and *short* incisions. When considering the relation these incisions bear to ventral hernia, we are confronted with the following facts:

1. Nerve supply, according to Woolsey (*Annals of Surgery*, Jan. 1898, p. 3), who points out the most important element in abdominal surgery as the nerve supply, comprising the six lower dorsal, the ilio-hypogastric and the ilio-inguinal nerves. Their motor portions pass, for the most part, between the internal oblique and the transversalis muscles, which, together with the external oblique, they supply, and then they pierce the sheath of the rectus muscle to furnish its motor nerve supply. "Their division causes paresis and atrophy of the muscles, weakens the abdominal wall and predisposes to hernia." Therefore, the longer the incision the more nerve fibers will be severed, thus increasing the chances of ventral hernia.

2. The making of the incision as much as possible through muscular tissue, according to Woolsey and McBerney, is open to well-founded objections. When the contracting and relaxing function of the muscles is taken into account, it is evident that the cicatricial tissue is constantly subject to a powerful tension, followed by relaxation, which when long continued has a tendency to weaken the cicatrix, and in time it gives way and is a factor in the causation of hernia.

3. The after-treatment should be as free as possible from undue irritation. The packing of the abdominal wound with gauze should be mentioned only to be condemned. It is not only unnecessary but decidedly harmful. It is a great source of irritation and discomfort to the patient. The pressure on the inflamed intestine may cause perforation, or intersusception. The theory upon which the wound is packed with gauze is: first, to prevent the pus from passing into and infecting the abdominal cavity; second to secure free drainage. Experience teaches us that the former condition is not secured; on the contrary the distention of the wound and separation of the parts is favorable to abdominal infection. The latter

condition—good drainage—is rendered difficult or impossible when the wound is pressed full of gauze. Leave the pus cavity and abdominal wound free from unnecessary interference, and nature will in a few hours shut off the septic region, by building a firm wall of protective adhesions around it. The healing process will not be delayed, and in a great percentage of the cases there will be no trouble from a future ventral hernia.

While it is hard to lay down any hard and fast rules, as the incision must conform to the particular conditions in each case, yet an operator has a characteristic method which he follows. The incision which combines conditions most favorable is a straight incision, not more than one and one-half inches in length, just external and parallel to the rectus muscles in the fibrous tissue of the linea semilunaris. In this location an easy and bloodless passage can be made to the cavity, and it is the only safe place one can be made in a pus case. The incision is closed in three layers: first, the deep aponeurosis and peritoneum are closed with a continuous catgut or kangaroo tendon suture; second the superficial fasciæ are closed in a similar way. Third the skin is united with a number zero catgut suture. When thus properly united it gives a firm cicatrix and is not liable to give way.

I have had four cases of women who have borne children after an appendectomy without injury to the abdominal wall; two were operated upon during pregnancy. With the short incision the nerve-supply is not cut off from the abdominal muscles.

In pus cases, the incision is seldom more than an inch and a half. After the abscess is cleansed with pyrozone, and washed out with the saline solution, a wick drainage is placed in the lower angle of the incision and the wound is closed, except for the drainage. The wound is never packed with gauze, for reasons previously stated. The following case came into my hands for operation for the radical cure of ventral hernia following an operation for appendicitis:

M. R., a boy aged 4 years, was operated upon for suppurative appendicitis by Dr. S., July 17, 1895, at the Hartford Hospital. Later a fecal fistula occurred, for the closure of which four operations were performed, the last and successful one by Dr. Wiggin of New York. During the treatment a rubber drainage tube was lost in the cavity. The patient returned home Aug. 19, 1896. In December following, an abscess formed on his back just above the brim of the pelvis. Jan. 2, 1897, the abscess broke and discharged, and the rubber drainage tube was drawn out through the opening. He was taken to St. Francis Hospital in October, 1897, to be operated upon for ventral hernia, where the following measurements were made by Dr. Geo. C. Bailey: The opening in the abdominal wall was three inches wide and three and a half inches long. The prospect for a successful operation was so uncertain that the members of the surgical staff were opposed to having the operation performed in the hospital. The patient was taken to my private hospital, where the operation was performed Nov. 27, 1897.

An incision was made the entire length of the opening in the abdominal wall, adhesions were broken up so as to free the intestines from their attachment to the abdominal wall. The tissues were dissected back so as to expose the free border of the rectus muscle. Four silver wire sutures were inserted an inch from the free border of the incision. The muscles were brought together by a continuous kangaroo tendon suture, passed through all the subcutaneous tissues, including the border of the rectus muscle, as they could not be separated, owing to the long-continued and inflammatory and suppurative process. The skin was then closed by a continuous kangaroo tendon. The silver wire sutures were drawn firmly together, so as relieve the tension on the stitches through the muscles. At the end of one week the wire sutures at the end of the incision were removed, one of the remaining was removed in ten days and the last in two weeks. A liquid animal diet was given to prevent the distention of the abdomen until a good union had taken place. The patient made an excellent recovery. At the present time there is no sign of the return of the hernia.

As a result of tracing two hundred consecutive cases following appendectomy in reference to ventral hernia, while not absolutely complete yet nearly so, my statistics are as follows:

Class 1. Cases without extensive adhesions—infected exudate masses of pus, 52; hernia, 0.

Class 2. Cases with extensive adhesions—without infected exudate masses of pus, 54; hernia 0.

Class 3. Cases with infected exudate masses or pus, 48; hernia, 6.

Class 4. Cases with infected exudate masses and pus—with perforation and gangrene, 46; hernia 4.

Total number of cases 200; hernia 10, or 5 per cent.

CONCLUSIONS.

The factors in the production of hernia, following appendectomy, are, 1. Long incision. 2. Cutting off nerve supply to muscles. 3. Incision made through muscular tissue. 4. Closing the incision with a single set of sutures in one layer. 5. Packing the wound with gauze. 6. It is a question if the length of the incision is not more important than the tissues through which it is made.

ADRENAL TUMORS OF THE KIDNEY.

[ABSTRACT.]

Presented to the Section on Surgery and Anatomy, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY BAYARD HOLMES, M.D.

CHICAGO, ILL.

Grawitz first described a group of tumors of the kidney which resembled the adrenal tissue in histologic elements. He named these tumors or this condition struma supra-renalis aberrata, and from that time on a war has been waged over these forms under various names, all of which are more or less significant. We may say, however, that at present, a tumor of the kidney is recognized, growing out of remnants of the embryonal adrenal gland left behind in the kidney substance itself. Similar tumors are found throughout the whole genito-urinary tract. These tumors are sometimes malignant, but more often benign. They sometimes produce constitutional symptoms, but usually they come to the notice of the physician or surgeon solely on account of their size and location.

The case which I wish to present to you very imperfectly and briefly is an illustration of that form of adrenal tumor which produces on the one hand constitutional symptoms of a most marked character, and on the other hand, shows the malignancy of metastasis.

Mr John C., 56 years old, came into the care of

Dr. Edgar Hawley of Chicago in March, 1897. He had been a healthy, temperate man, and suffered no disease worthy of mention during his whole life. He had always led a moderate life, and been occupied most of the time in active office work, but during the past six or eight years has been confined for a reasonable number of hours each day to book-keeping. During the week preceding his illness he had lost in strength and appetite, but had slept well, complaining only of occasional loss of breath.

Dr. Hawley was called on the second day of the patient's absence from work. The patient was lying upon his right side; his breathing was rapid and he complained of excessive pain in the region of the right thorax. His pulse was slow, 72, and his temperature low, 99. He coughed frequently, and expectorated a bloody mucus resembling the rusty sputa of pneumonia. The patient's face was blanched, his lips red, but turgid, and an examination of the thorax revealed dulness over the whole lower half of the right lung, accompanied in places by complete absence of vocal transmission; while in other places, especially in the upper front part of the chest, there were many spots of bronchial breathing and crepitant râles. The area of cardiac dulness was greatly increased, and the area of hepatic dulness projected 2½ to 4 centimeters below the border of the ribs. The patient's digestive functions were carefully examined without disclosing any significant fact. Urinalysis showed that it contained no abnormal constituent, except an increased quantity of indican and an increased quantity of all the normal constituents. The patient was able to rise and sit up to drink and for stool. Symptomatic treatment was instituted. On the third day of observation the pleuritic effusion was so great and the dyspnea so severe that Dr. Hawley removed three pints of bloody serum with the aspirator. The temperature remained about 99 and the pulse varied between 70 and 80. Two days later it was necessary to remove another quart of effusion, and a week after the beginning of treatment I was called in consultation on account of the gravity of the symptoms and the failure of the consolidated lung to show any symptoms of resolution.

When I saw the patient he was suffering from terrible dyspnea. His face was full, but blanched. His lips were a bright red. His eyes were bright and expressive. He seemed to weigh about a hundred and seventy pounds. There were no symptoms of emaciation. His hands were thin and white. His whole appearance reminded me of sclerosis of the kidney, and I instinctively uncovered his legs, expecting to find them greatly swollen with edema. I was surprised to find the legs and feet solid, but well-formed and excessively pale. The pulse at this time was hard and full, and very slow, 70 to the minute. The temperature was not quite 100, and it had never been above 100.5 at any time. My examination confirmed the examination of Dr. Hawley. There was a considerable effusion in the right pleural cavity, with a large mass of atelectatic tissue above it. The liver was depressed about 4 centimeters, but did not extend abnormally to the left. The heart's apex was 3½ inches from the median line, but the area of cardiac dulness extended at least 2 cm. farther to the left and 3 cm. lower than normal. The heart's apex was readily recognized on account of the fierce stroke which it made on the wall of the thorax. A careful examination of the left lung detected bronchial breathing and cog-wheel respiration in two or three places in the upper lobe; but on account of frequent coughing, these observations were not considered significant. The patient frequently expectorated a tenacious mucus which was once in a while tinged with blood. No very satisfactory examination of the abdomen could be made, because the patient could not lie down on account of the dyspnea. I assisted Dr. Hawley to remove the effusion. We succeeded in aspirating three pints of bloody serum. The character of this effusion resembled that which I had observed in cancer of the lung. A microscopic examination of this serum did not reveal any bacteria, but showed the presence of red blood corpuscles, white blood corpuscles and a few epithelial cells of uncertain origin. The examination of the sputa did not disclose the presence of the pneumococcus. After the removal of the effusion, the liver came back to its normal position under the border of the ribs.

With the absence of the evidence of pneumonia, with the absence of cachexia, with the sudden onset of the disease and its rapid course, I was only able to make an unfavorable prognosis, leaving the diagnosis entirely to the postmortem. The subsequent course was similar to the preceding. The dyspnea continued, the pulse remained very slow and hard and full. The patient complained of no pain, and the temperature never rose above 100.5.

The postmortem was made three weeks after the beginning of the disease and twelve hours after death. It was made by Dr. Henry D. Galloway and Dr. Edgar Hawley in the presence of the house staff and nurses of the Baptist Hospital.

The body was that of a well-nourished man, apparently fifty years old. Postmortem rigidity had begun. There were no marks of swelling or edema and only a small puncture where the last aspiration had been made between the fifth and sixth ribs in the right axillary line. The right thorax was dull on percussion, the left resonant. On opening the right pleural cavity, a large quantity, probably a quart, of bloody serum without flakes or clots was removed. The right lung was a mass of solid tissue, which on section showed it was composed of light, reddish masses, contrasting sharply with the bluish-black and mottled appearance of the intervening edematous lung. These masses were hard and firm, and did not subside under pressure. They were of a uniform texture, and seemed to be the outgrowth of multiple centers. The left pleural cavity contained three or four ounces of clear serum. The left lung presented a normal, but highly pigmented appearance. The lymph glands at the root of the lung were filled apparently with years of accumulated coal dust. Three foci similar to those in the right lung, but no larger than hazel nuts, were found in the lower part of the upper lobe of the left lung. The pericardium was filled with six ounces of clear serum. The heart muscle was firm, and the ventricles contracted. The coronary arteries were markedly sclerotic. The valves of the heart were competent, but showed marked sclerosis, and in places calcification. The abdominal cavity was free from fluid. The liver and spleen were normal, excepting for a general arterio-sclerosis. The stomach and intestines presented no marked abnormality. The right kidney was of normal size and shape and position, and was connected with the bladder by a normal ureter. The right adrenal body was of normal size and shape and location. The left kidney was surmounted on its upper end by a firm, hard tumor,

the size and much the shape of a small clenched fist. Like the right kidney, it was surrounded with fat. On section the kidney itself seemed perfectly normal, except that it was encroached upon in its upper part by the tumor, but separated sharply from it by a wall of connective tissue. This kidney was connected with the bladder by a normal ureter, and there is no reason to believe it in anything but a healthy condition. The cut section of the tumor showed that it was composed of various nodules, the center of each of which was in a more or less advanced stage of apparently fatty degeneration. In a few places masses apparently of old extravasated blood were to be found. The growing portions of the tumor were nodules the size of peas, and at the periphera of the tumor. The blood supply of the tumor seemed to be rich, and on carefully dissecting up the renal vein, the tumor was found to have invaded it so as to actually hang into its caliber.

Microscopic examination of this tumor showed that it was a typical struma suprarenalis aberrata of Grawitz. Microscopic examination of the tumors found in the lungs showed that they were of the same character.

A study of the literature of this subject may be summarized in the following conclusions:

1. Remnants of the adrenal body are found in various parts of the genito-urinary tract in a large per cent. of all postmortems (90 per cent.)

2. The suprarenal capsule or adrenal body is a ductless gland essential to life. It secretes a substance which slows the pulse, contracts the capillaries, and removes the pigment from the skin. When it is destroyed or removed, the patient dies, or if partially destroyed, he takes on the condition recognized in Addison's disease. When the adrenal body is greatly increased in its function, the skin is blanched, the heart's action is increased in power, but slowed, and the capillaries are contracted, and the whole vascular system undergoes the degeneration of arterio-sclerosis.

3. About one-third of all the tumors of the kidney appearing in adult life are of adrenal origin, but only a small proportion of these show a tendency to metastasis, and these metastatic foci are usually confined to the lungs or to the bones, and only rarely are they found in both places.

4. A few of the adrenal tumors produce the symptoms of poisoning with the adrenal extract. The poisoning does not always seem to be proportionate to the size of the tumor.

5. The removal of the tumor before metastasis takes place results in subsidence of the symptoms of poisoning. The tumors may be removed without loss of kidney substance, or by a complete nephrectomy.

CLINICAL RESULTS OBTAINED BY THE USE OF MY INSTRUMENT FOR COLLECTING THE URINE SEPARATELY FROM THE TWO KIDNEYS.

Presented to the Section on Surgery and Anatomy at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY M. L. HARRIS, M.D.
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CHICAGO, ILL.

A description of my instrument for obtaining the urine separately from the two kidneys was published first in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Jan. 29, 1898, and again in *Medicine* in April, 1898. The object of the present paper is to present a few clinical facts obtained by the use of the instrument, which demonstate its advantages, applicability and reliability.

Case 1.—Mrs. D., age 31 years, American, without particular hereditary tendency. Except for present trouble she has always been a strong, active, healthy woman. About four years ago she began to have pain in the lumbar region. The pain was dull and intermittent and increased by violent exercise such as dancing, driving or riding in the cars. The attacks of pain increased in frequency and severity and in a year or two the urine after exercise, particularly dancing, was very dark in color and there would be a desire to urinate frequently. Twice she had attacks of severe pain in the left lumbar region followed by the passage of a small calculus. The pain in the back became almost constant and she was obliged to discontinue all exercise on account of the great increase of pain and hematuria excited thereby. The urine contained blood almost constantly, although, except following exercise, it was so slight in amount as to require the microscope for its detection.

On Feb. 14, 1898, by means of my instrument I collected the urine separately from the two kidneys. An analysis of the urine thus collected is as follows:

	Right kidney.	Left kidney.
Amount collected in 20 minutes	12 c.c.	10 c.c.
Color	Clear amber.	Cloudy, very light brown.
Reaction	Neutral.	Strongly acid.
Urea	0.7 per cent.	1.2 per cent.
Albumin	Slightest possible trace.	Small amount.
Microscope	Negative.	Red blood cells abundant; numerous flat epithelial cells, singly and in masses of several hexagonal cells; few leucocytes.

This analysis pointed very conclusively to the left kidney as the seat of the trouble, and taken in connection with the history made a diagnosis of renal calculus certain. One very interesting point shown by the analysis is the marked difference in the reaction of the urine of the two kidneys secreted at the same time. That from the right side being *neutral* while that from the left side was strongly *acid*. As the reaction was taken at once before secondary changes could take place an interesting point is thus brought up, namely, to what extent local conditions within the kidney may influence the reaction of the urine. It may be mentioned here, as adding to the interest and importance of this point, that the calculus found in the left kidney was composed of almost pure uric acid. As the patient had received prolonged medical treatment without benefit surgical measures were decided upon and on March 8, 1898, an incision parallel with and one centimeter below the twelfth rib was made, exposing the left kidney, which was cleared of its surrounding fat. Nothing abnormal could be detected by sight or palpation of the kidney. The pelvis of the kidney was then opened by an incision along the convex border. In passing through the substance of the kidney a small abscess containing six to eight cubic centimeters of thin light brown pus, was evacuated. A calculus was found lodged in one of the calyces and removed. It was only with considerable difficulty that the calculus was found and removed even after the finger had free access to the pelvis. The pelvis of the kidney was washed with hot sterilized water, the kidney sutured with catgut and the incision closed in layers, except at the angle, where a small iodoform gauze packing extended down to the kidney. This was removed on the second day. Healing followed *per primam* with perfect recovery.

Case 2.—Mr. H., American, age 37 years, family history good, never had any illness prior to present trouble, except gonorrhea, which he had had several times. About two years ago, following shortly after an acute attack of gonorrhea he

had a severe illness lasting about six weeks. It was attended by fever, pain in the right side of the abdomen and right lumbar region. During this illness there was a sudden discharge of a large quantity of pus with the urine. He has never been well since this acute attack although he has been around and able to do some work. He has suffered almost constantly from pain in the right lumbar region, frequent urination, which is better and worse at times, and occasionally has spells of fever with chills, sweats, etc. There is pus in the urine constantly. Is pale, anemic, considerably reduced in flesh, and quite weak. His temperature varies from 100 to 103.5 degrees F. He sleeps poorly and has frequent night sweats; appetite poor; no cough. He urinates frequently, without difficulty. The urine contains considerable pus, although he says it is now what he calls quite clear, not containing as much pus as it does at times. Upon examination a large, rather firm, quite fixed tumor is easily felt in the region of the right kidney. All other organs appear to be normal. A clinical diagnosis could be made of cystitis with pyonephrosis of right kidney, probably of gonorrheal origin.

The main questions to be determined were: Is the left kidney already involved, and is it able to do the work alone, provided the right kidney be removed? To determine these points, on Feb 19, 1898, I collected the urine with my instrument. Owing to the presence of the cystitis, the bladder was thoroughly irrigated with sterilized water after the instrument was introduced and fixed in position. The urine all came from the left side, not a drop was found to come from the right kidney. The analysis of the urine thus obtained showed: amount in twenty minutes 14 c.c.; perfectly clear, dark amber, acid; urea 2.3 per cent.; albumin, very slight trace; very few flat epithelial cells, scattering leucocytes and a few cylindroids. The value and efficiency of the instrument are clearly demonstrated in this case.

Notwithstanding the existence of cystitis and a large amount of pus in the urine, we were enabled by the instrument to attain perfectly clear, practically normal urine from the left kidney. It demonstrated to us that the left kidney was normal and that it was doing all of the work. The amount collected, 14 c.c. in twenty minutes, is equivalent to 1008 c.c. in twenty-four hours. By actual measurement the amount passed in twenty-four hours was 1057 c.c. This again shows that the left kidney was doing all the work, and demonstrates how perfectly the septum is formed by the instrument in the bladder. It being satisfactorily shown that the left kidney was normal and able to carry on the work alone the patient was operated on Feb. 21, 1898. A long oblique incision was made beginning near the outer end of the twelfth rib and extending downward and forward internal to the anterior superior spine of the ileum. The kidney was found embedded in an immense mass of thickened, firm, connective and adipose tissue containing numerous foci of suppuration. One large perinephritic abscess containing from 100 to 200 c.c. of thick yellow pus was evacuated. It lay between the superior pole of the kidney and the inferior surface of the liver. The kidney was found to be a mass of innumerable small abscesses. There was no dilatation of the pelvis. The whole kidney was so involved in a dense connective tissue mass that no pedicle composing the vessels for ligation could be formed. Two large angular clamps were therefore applied to grasp the renal vessels, and the kidney with considerable of the connective adipose mass removed. The clamps were left in place and the wound packed with plain sterilized gauze. Considerable shock followed the operation and for forty-eight hours the patient was quite low. At the end of this time the clamps were removed. He now began to improve rapidly, temperature became normal, and he left the hospital March 12, less than three weeks from the date of operation, with the wound almost healed. The cystitis improved remarkably, the urine, which he was passing freely, contained but very little pus when he was discharged.

Inoculations made from the perinephritic abscess on blood serum agar developed a diplococcus resembling the gonococcus, which died out in the second generation. The kidney upon examination was found to be tuberculous and the secreting portion practically destroyed.

Case 3.—Mrs. S., age 39 years, American, has been suffering many years with what was supposed to be cystitis. She had painful and frequent urination with pyuria, the frequency becoming so great that she was obliged to wear a urinal constantly. She also suffered with a burning pain in the sacral region, which frequently extended into the thighs. She had some pain in the lumbar region, which was always referred to the left side and no pain on the right side. She was treated for years for bladder trouble, receiving all manner of irrigations, local application, etc., without benefit. She then came into Dr. J. Frank's hands, who, upon cystoscopic examination, decided for the first time that her trouble was not located in the bladder. Dr. Frank tried cauterization of the ureters, after Kelly's method, and, although he succeeded repeatedly in catherizing the left side could never succeed on the right side. There was no tumor to be felt in the region of the kidney on either side, but some pain was always referred to the left side. Through the kindness of Dr. Frank I was asked to examine her with my instrument. This was done, March 10, 1898, with the following result:

	Right.	Left.
Amount collected in 20 minutes.	8 c.c.	10 c.c.
Color	Pale, milky, cloudy.	Clear, light amber.
Reaction	Neutral.	Acid.
Urea	0.05 per cent.	1.05 per cent.
Albumin	Well marked quantity.	Small amount.
Microscopic	Pus-scattered cells and in large clumps or masses. Few red blood cells.	Few flat cells and an occasional leucocyte.

No bacteriologic examination was made.

The examination demonstrated conclusively that the disease was located in the kidney and in the right one alone; the left kidney was secreting practically normal, healthy urine notwithstanding the fact that the pain had always been referred to the left side. The character of the fluid obtained from the right side, thin, purulent, albuminous, neutral, 0.05 per cent. urea, showed that the secreting portion of the kidneys must be almost entirely destroyed with little else than a pyocystic condition remaining.

Upon the results of this examination Dr. Frank removed the right kidney March 19, 1898. He found the kidney practically destroyed, nothing but a multiple, cystic, purulent, tuberculous mass remaining. The ureter was much thickened and dilated. The patient recovered. This case illustrates a very important point which has been observed before, namely, the pain is not always referred to the diseased side. This patient never complained of pain in the right kidney, the diseased one, but always in the left kidney, the apparently healthy one.

Case 4.—Mr. S., age 30 years, decorator, good family history, never seriously ill and no sequelæ to the usual diseases of childhood. States he had a serious and continuous hematuria eight years ago, which persisted for eighteen months, then ceased. Four years ago he had a severe fall on the walk, but noticed no trouble from it. Two years since he again noticed the hematuria for which he consulted an eminent specialist who made a cystoscopic examination, thought he saw a papilloma of the bladder and advised exploration. The patient drifted away and after two years consulted Dr. Whitfield who referred him to Dr. L. L. McArthur for diagnosis.

Examination revealed a somewhat anemic condition of a

young man of good physical development without a subjective complaint. Blood examination showed lowered blood count, relative proportion normal. No plasmodium. The urine was constantly bloody, although the amount of blood present varied somewhat from time to time. It was always intimately mixed and unaccompanied by clots of any dimension. The amount of urine in twenty-four hours was 54⅞, sp. gr. 1020, and albumin; no sugar; no pus. Microscopic examination showed no elements except the blood and an occasional blood cast.

Through the kindness of Dr. McArthur, I had an opportunity to use my instrument on the patient. The result was most satisfactory and very striking. The urine from the right kidney was perfectly clear, and normal in every respect while that from the left kidney contained all of the blood, demonstrating absolutely the left kidney as the source of the hematuria.

These four cases are by no means all that have been examined as I have made now some forty examinations. Each of the four cases mentioned, however, illustrates some particular point and taken together they demonstrate the wide range of applicability of the instrument.

Case 4 is an absolute demonstration of the completeness and perfectness of the septum or watershed formed in the bladder. A more beautiful demonstration could scarcely be imagined; in one vial the red, bloody urine, while in the other perfectly clear, normal urine.

Case 2 demonstrates the fact that clear normal urine can be obtained from the kidney notwithstanding the presence of a purulent cystitis.

In Case 3 the use of the instrument led at once to a correct localization of the disease and the side involved, when the symptoms all pointed to the opposite side as the one probably diseased. This much for the clinical aspect of the subject. Concerning the mechanical use of the instrument it may be said that this is not difficult. A few simple rules that have been sufficiently detailed elsewhere are all that are necessary to follow. Most of these are such as would naturally suggest themselves to any intelligent physician attempting to use such an instrument. Some may appear trivial but all of them have been found by actual experience to be necessary in order to guard against a possible error or to facilitate the use of the instrument. By following these simple rules I feel certain the results will be most gratifying and the necessity of laying both kidneys free on the back to determine the presence and extent of disease in them as recently recommended by Edebohls (*Annals of Surg.*, 1898, xxvii, 425) will no longer exist.

DISCUSSION.

Dr. McARTHUR of Chicago—I have used this instrument and bear willing testimony to the excellent results. Very few of us who have attempted ureteral catheterization have done so without experiencing great difficulty, but it is now easy to obtain the urine in two separate bottles, and I have been charmed with the result. Take the case of a man who has passed bloody urine for years without any symptoms clinically or any evidence microscopically of a disease, and you have a case that will at first puzzle you. In such a case, to have two bottles of urine side by side will convince you that the blood is coming from above, and that the trouble is in the kidneys. In the same way an enormous tumor of the right side, which needs to be diagnosed from a cyst of the gall-bladder or a cystic kidney of the right side, will be proven—although previous examination of the urine has shown nothing of interest—to be a cystic kidney, and not a cyst of the gall-bladder, by the total absence of any urine from that side. An incision can be made and the diagnosis confirmed.

INJURY TO PERIPHERAL NERVES AND THEIR SURGICAL TREATMENT.

Presented to the Section on Surgery and Anatomy at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY A. H. LEVINGS, M.D.

MILWAUKEE.

It may be stated without fear of successful contradiction that the subject of injury to peripheral nerves is one which has not received any very extensive consideration from surgeons. It is indeed true that the frequency of nerve injury is not great when compared with injury to bone, muscle, artery or vein, but when such an injury does occur, especially if to a principal nerve, the importance of the injury is unquestioned. If a motor nerve be divided, its function throughout the area of its distribution is at once arrested, and this loss of function, excepting some slight restoration which may come from anastomosing branches, remains until the continuity of the nerve fibers has been re-established.

The opinion almost universally held by pathologists and surgeons is that certain characteristic changes occur in a peripheral nerve after division, these changes being more pronounced in the terminal than in the central portion of the divided nerve. The changes consist in the breaking up of the medullary sheath into fat drops, and their absorption with a disappearance of the axis cylinder, the neurilemma sheaths alone remaining. It is also generally accepted that following the section of a nerve, if it be properly sutured, regeneration commences in the central end by a splitting up and growth of the axis cylinders which are projected to and through the neurilemma sheaths to the very peripheral portion of the nerve; following this medullary sheaths are formed around the axis cylinders. Some hold that regeneration is effected through the nuclei of the neurilemma.

It was for the purpose of determining, as far as possible the extent of nerve degeneration after section, and the manner of the regenerative changes, as well as the best method of surgical procedure in divided nerves, that I undertook a large number of experiments upon the sciatic nerve of different animals. Eighty-five sections of the sciatic were made, and seventy specimens were taken and examined, both macroscopically and microscopically. So far as my experimental work goes it seems to demonstrate that the presence or absence of degenerative changes in a divided nerve depends very largely upon the treatment instituted, and also, to some extent, upon the state of health of the animal operated upon.

If a divided nerve be immediately sutured, or if a gap caused by resection be immediately bridged with some suitable material, and the work be done aseptically and properly, but slight degenerative changes will take place either in the distal or proximal portion of the nerve; and the nerve's function will, in the great majority of cases, be quickly re-established.

On the other hand, if the nerve ends be not approximated, if an interval caused by resection be not bridged, or if suppuration occur in the wound, then pronounced degenerative changes will occur in the nerve, more especially in the terminal portion, and a restoration of function will not occur. In opposition to the oft-repeated statement that "a divided nerve will first degenerate throughout its entire peripheral extent, and be absorbed and following this, regenera-

tion will take place through a branching and shooting of the axis cylinders before function can be restored," stands the clinical fact so often observed, that after section of a nerve and immediate suture, function, both motor and sensory, has been established in a few hours or days, confessedly too soon for the complicated process of degeneration to have occurred.

Neither in analogy nor in physiology am I aware that there is anything which would bear out such a statement. It is supposed by Howell and Huber that in the normal nerve fiber the nutrition of each internode is directly controlled by the internodal nucleus; and that the metabolic activity of the nucleus in turn is influenced by trophic impulses received through the axis cylinder from the nerve centers. When the flow of these impulses is interrupted, the metabolisms of the nucleus and its dependent structures, myelin and internodal protoplasm, are altered, and the degenerative changes in the myelin and axis cylinders take place. After division of a nerve, anything which connects the two ends, whether it be by immediate suture or by filling up a gap between the separated ends with some suitable material, seems to render possible the continuance of these trophic impulses to the peripheral portion of the nerve; thereby sustaining metabolic activity, preventing degenerative changes and favoring repair and the early restoration of function.

An examination of my specimens convinces me that the neurilemma with its nuclei plays an important part in the restoration of a divided nerve. If a longitudinal section of a nerve be examined shortly after function has been restored, one will find at some distance from the place of union the nerve fiber in a normal condition. As one approaches the line of union the nerve fibers grow smaller, thinner and fewer, and when at the line of junction there will be seen a leasch of fine neurilemma strands crossing the field and coming from both directions. Some of the fibers have a medullary sheath, while the major part have none. Both the central and distal portions of the nerve seem to take an active part in the projection of the neurilemma threads across the line of section.

Essentials to a successful operation.—1, absolute asepsis, for without this we cannot hope to succeed; 2, the nerve should not be separated from its connective tissue surroundings; 3, the nerve ends should be approximated squarely and evenly, and without tension; 4, if an inch or more of the continuity of a nerve be lost the gap should be bridged with some material having longitudinal strands or fibers; 5, contrary to the common belief, absolute rest of the limb is not an essential to success. The methods of operating may be divided into immediate suture, bridging a gap and secondary suture. A divided nerve should be united at the earliest possible moment, as this will lessen degenerative changes and will favor the early restoration of function. Where there has been a simple section of the nerve, or a resection of less than an inch, the nerve ends may be approximated by slight stretching and held by two sutures placed at right angles to each other; the nerve ends should be allowed to just touch each other. If the stitches are drawn tighter than this, the nerve fibers will be bent at a considerable angle near the ends, and the restoration of function will be much hindered.

Restoration of function.—In nine resections of the sciatic of less than an inch, and in thirteen sections with immediate suture, function was restored in one case in five days, in one in nine, in two in ten, and in one each in thirteen, seventeen and twenty-six days respectively. Three of the animals died, and of the remainder function was imperfect at the end of thirty days. The results in a few are not stated. The success of the operation depends very much upon the technique; and in dogs upon their condition. Operations done upon unhealthy dogs, or during the summer when they may be pestered with flies or fleas, give poor results.

Filling a gap.—In cases where an inch or more of the continuity of the nerve has been lost, one of several methods may be resorted to for the purpose of supplying the deficiency. The nerve may often be stretched sufficiently to approximate its ends. Forcible stretching of a nerve in order to approximate its ends has not, in my experience, been productive of good results, and I do not believe it is desirable. Forcible stretching produces degeneration and favors paralysis. Splitting of one or both ends of the nerve and turning a flap or flaps, has been and is practiced. This method does great injury to the nerve and has nothing to recommend it. The flap does not remain as a vitalized part of the nerve, but simply acts as a bridge through which the nerve fiber must grow, and the bridge is badly situated for the purpose. The flap method was practiced three times in my experiments; in one case some slight restoration of function made its appearance upon the fifteenth day. There had been in this case resection of one inch of nerve. The other two experiments were failures.

Bridging the gap with a piece of nerve taken from another animal is an excellent method, and has but one objection: the technique is complicated, requiring an animal and two operations instead of one. In a dog, after resection of one inch of the sciatic, I introduced a like piece of the sciatic from a rabbit. After fifty days there was no return of function; but of course this single experiment proves nothing. In three instances I brought the ends of the resected nerve inside of a piece of decalcified bone, running threads from one end of the nerve to the other. The results in these experiments were not as successful as by some other methods.

Bridging the gap with silk threads.—Auger, Assaky and Glück had used this method for bridging gaps in tendons, and Assaky applied it to bridge defects in nerves, using catgut. Abundant experience has shown that when a portion of nerve up to three inches has been resected and the gap filled with some suitable material having longitudinal fibers or strands, and thus indirectly connecting the nerve ends, this bridge will act as a scaffolding through and upon which nerve fibers will be projected, filling the gap and re-establishing the nerve function. Experience has shown that silk strands, preferably six in number, stretched from one end of the nerve to the other, act as such a scaffolding and fulfill the indication extremely well. Seven experiments were made with the silk bridge, having resected from one to two and one-half inches of the nerve. In one case function was restored in twelve days, in others in twenty-one, twenty-two, twenty-five and forty-six days, respectively; one animal escaped, and of one there is no record.

Bridging the gap with muscle.—While making these experiments it occurred to me that a piece of the adjacent muscle might be used to advantage to fill the gap, as it was always at hand, was porous, and had

longitudinal fibers, and having the additional advantage of affording a vitalized bridge. Thirty-eight experiments were made with a bridge of muscle. In my earlier experiments the small piece of muscle was detached entire with its fascia. In the latter experiments, the piece was detached only at the ends, leaving it connected in the middle and thus insuring the continuance of its vitality, and giving more uniform and better results. In these experiments the extent of nerve resected varied from one to three inches. In two cases function was restored in 10 days, and in others in 12, 17, 22, 26, 28, 29, 30, 31, 35, 40, 42, 50, 51, 52, 75, 90 days, respectively. Some of these operations were secondary. In one case, after resection and prevention of union, the bulbs were after a few weeks resected and a three-inch piece of muscle introduced. Function was restored in forty-two days.

I am able to report the following case in which a secondary operation was done and pieces of muscle were used to bridge the gaps: Mr. J. B., aged 46, consulted me in January last on account of an injury which he had received in 1869 by falling upon a sharp scythe and cutting the ulna and median nerves in his right wrist. In the closing of the wound no attempt was made to unite the nerves, and there occurred at once complete loss of sensation in the area and paralysis of the muscles supplied by these nerves beyond the site of division. At the time the patient presented himself to me there was partial restoration of sensation in the hand, but paralysis was still complete with great muscular wasting. On February 5 I cut down upon the nerves and resected the bulbs. In the case of the median these were indirectly connected by a band of connective tissue. There was absolutely no connection between the bulbs on the ulnar. There was a gap of more than an inch in the ulnar and of three inches in the median. These gaps were bridged with pieces of muscle taken from the superficial flexors. After the operation there was absolute loss of sensation in the hand. In six weeks sensation was fairly well restored excepting in the terminal phalanges; and now after four months, sensation is almost normal. Muscular function has not up to the present time been much improved, although there is a seeming gain, especially in size and control of the muscles of the little finger, and to some very slight extent, also, in the thumb.

I would submit the following conclusions:

1. That immediate suture, or immediately filling a gap after resection, prevents marked degenerative changes in a nerve.

2. In gaps of one inch or more it is preferable to put in a bridge rather than approximate the nerve ends by stretching.

3. That the new nerve fibers are formed by the nuclei of the neurilemma, and that both the terminal and the central ends take a prominent part.

4. That the operation, to succeed, must be done aseptically.

5. That in approximating the nerve ends, or putting in a bridge, the sutures must only allow the abutting ends to touch.

6. That for the purpose of filling a gap there is no material in use at the present time which compares with muscle.

DISCUSSION.

Dr. CHARLES A. POWERS of Denver—I would like to relate a case which occurred in my own practice, of a somewhat similar nature. It was the result of a railroad accident causing a laceration of the external popliteal nerve. The wound was cleaned out and in six weeks I united the ends of the nerve by bridging with a piece from the sciatic nerve of a dog. Before uniting the ends were about four inches apart. I used fine black silk thread, passing it merely through the sheath of the nerve, simply allowing the cut ends to come in contact, and the wound healed by first intention. Sensation began to return on the sixth day and was complete in four weeks, but function has never returned. As to the choice of material to employ in bridging a nerve, I think, perhaps nerve tissue itself is as good as anything. Dr. Levings seems to have gotten excellent results from muscle tissue, but both are easy to get.

Dr. R. H. REED of Rock Springs, Mont.—The question is one of great interest to all of us, as we are constantly coming in contact with emergency work of this kind and it is necessary for us to give our patients the best possible results. If the function of the nerve is destroyed and the ends can not be brought together, the distance being so great that bridging would be of considerable length, it is often necessary to find some other method of restoration. It has been shown that the proximal end of the nerve is the one where regeneration commences, which is modified by the amount of nutrition at the distal end. By using neural infixation in the way I illustrate on the blackboard, the function of the injured nerve is readily restored. Galbraith first demonstrated this in a case of injury to the musculo spiral nerve, and I have secured very good results in a number of cases where I have employed it, motion and sensation being restored. As to the time being several months before regeneration takes place, this is a mistake, as in several cases in which infixation has been employed, the function of the nerve has been restored in ten days. I have seen it show itself in five days, and in thirty days the use of the arm has been complete.

Dr. LEVINGS, in closing—As to Dr. Powers' case, in which sensation was restored but not function, this is often the case and has occurred in my own practice, I believe, owing to an anastomosis of collateral branches. Concerning the material to be used, I believe silk is the best. I have employed catgut, but it fails. As to the bridging of a nerve, there is nothing that can be said against it except that it requires an animal and two operations. The nerve does not retain its vitality as a nerve, but simply as a scaffolding. It used to be thought the two ends of the nerve were healed and the integrity of the axis cylinder retained, but this is incorrect. I seldom make a bridge of more than three or four inches in length. Dr. Reed's method is one that is well recognized and it is all right where it can be accomplished, but the nerves are often widely separated. In a case where the ulna and median have been divided, you only have the radial left, so that the method could not be employed under such circumstances.

SURGICAL TREATMENT OF PERITONEAL TURERCULOSIS.

Presented to the Section on Surgery and Anatomy at the Forty-ninth Annual meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY BYRON B. DAVIS, M.D.

OMAHA, NEB.

With one exception the recent writers I have consulted are in full accord in the assertion that laparotomy is a potential factor in the cure of peritoneal tuberculosis. Curtis (Twentieth Century Practice, Vol. viii), says that he is of the opinion that the disease is not so fatal after all has been supposed, and that many of the cases of recovery after laparotomy are instances of spontaneous involution. On the other hand, from Koenig, who in 1884, first brought this mode of treatment forward and proposed it as a formal measure, reporting three cases cured, to the latest writer on the subject, most of those who have had experience with the method have been in accord in asserting its value. The early dissenters from Koenig's doctrine were men who had not tried the treatment. A few trials usually convinced the most skeptical. The percentage of cases cured by laparotomy is variously stated at from 35 to 80 per cent. The former figure is probably too small and the latter too large. Unfortunately there seems to have been

very little account taken of the stage of the disease at which operative interference was undertaken, or of the organs, other than the peritoneum, involved.

Though in the majority of instances simple incision through the abdominal wall has been sufficient to produce the desired result, there are frequent cases in which more than this must be done if the best results are to follow. If, for instance, tuberculosis of the tubes or ovaries antedates the peritoneal infection, permanent cure following simple abdominal incision could not be counted upon with any degree of certainty. Temporarily the desired object might be obtained, but with a tube or ovary centrally diseased, a second infection of the peritoneum would be imminent. In such a case the operator serves his patient best if he removes the tube and ovary in order to guard the peritoneum against a reinfection. In the same way, if a tuberculosis of the intestines, of the appendix or of the mesenteric glands is the source of the peritoneal infection, and the disease at the original focus is still active, to expect permanent immunity—the primary focus being untouched—would be scarcely reasonable. The omission of the removal of the primary focus of the disease is undoubtedly frequent, and it is also believed that late relapses—really new infections from the original source—are much more numerous than is generally supposed. The late relapse is a proof of the incompleteness of the operation.

An operation may be incomplete because the operator fails to recognize the primary focus of the disease; because such focus cannot be removed without too great risk to the life of the patient, or because the operator fails to recognize the menace of a second infection. So important do I consider this, that it is my practice, when not readily apparent, to make a careful search among the abdominal viscera when operating for this disease, in order to find and remove everything which seems suspicious or threatening. The only contra-indication to the removal of the primary focus is when it cannot be done without too great risk to the immediate life of the patient. The question of how extensively to remove the diseased tissue must be decided on the merits of each individual case. In deciding how much the patient can safely endure, the surgical judgment of the experienced operator will seldom lead him astray. If no primary focus of disease is found, we are to conclude that it is so slight that it has been overlooked, that the disease originated from a distant part of the body, that it is of the so-called hematogenous type of infection, or that the primary source of infection has undergone spontaneous involution.

Shall we irrigate or not irrigate? The question of irrigation may safely be left to the taste, choice or habit of the operator. Unless there is found in an individual case a special reason for irrigation, as broken down caseous masses, pus or flocculent serum, nothing is to be gained by the use of irrigation. In 308 cases collected by Aldibert the most favorable results were found among those in which the abdomen was merely opened. Perhaps a tendency to irrigate the worst cases, and to omit the measure in the less severe, will account for this discrepancy.

Shall drainage be used or primary suture be employed? For reasons which I hope to make plain when speaking of the manner in which the cure is produced, it is my opinion that drainage is a real detriment to cure, and that where it is safe to omit drainage and close the wound at once the best results will be secured.

The question of the breaking up of adhesions is also one to which it is not best to attach any hard and fast rules. If old and firm and extensive, little will be gained and much risk will be run, if one is too diligent in this direction. The fact that new adhesions will almost immediately form, that the integrity of the bowel is likely to be compromised, and the additional shock which too much energy in this direction entails, all speak for conservatism in dealing with adhesions. The curative ratio is fully as high, as far as it has been possible to ascertain the results, where dense adhesions have been allowed to remain. On the other hand, if any adhesions threaten to produce intestinal obstruction by causing angulation or constriction, if they are new and easily separated, or if they prevent access to a supposed primary focus which it is desired to remove, they should be carefully separated.

Why does the performance of abdominal section cure these cases? This question is approached with a great deal of hesitation. That it does cure is abundantly proven by hundreds of recorded cases. A recent experience in two cases, in which I had the privilege of doing secondary laparotomy for other purposes, and in which I found perfect cure of the peritoneal tuberculosis, has brought this subject before me with renewed interest. A variety of ingenious theories have been brought forward, most of them entirely unsatisfactory, a few which look reasonable. In order to study the phenomenon advantageously it may be well to consider the histological changes which occur in the tubercle during the process of healing. Recall for a moment the histological elements of the tubercle. First, there is an accumulation of round cells (lymphocytes) about the group of vessels at the point of infection; next, some of the round cells in the center of this mass are transformed into epithelioid cells rich in protoplasm; multiplication and growth of same; one or two giant cells formed by nuclear proliferation of epithelioid cells; the next step is the formation of the connective tissue framework; tubercle bacilli are also present. In the young tubercle the round cells predominate; then the epithelioid cells gain the ascendency, these last slowly enlarging by the swelling of their protoplasm. In the completed tubercle the connective tissue takes a concentric form at the periphery; it is sometimes very delicate, scarcely perceptible, sometimes strongly developed, forming a sort of capsule for the tubercle, and is endowed with fibro-blasts. In the center of the tubercle the connective tissue forms a very delicate stroma. Only very seldom is the central framework strongly pronounced, and in old tubercles it is scarcely perceptible between the closely packed epithelioid cells. Later in the history of the tubercles caseation occurs in the center, and then the connective tissue framework at the center disappears. Gatti of Turin, to whom I am indebted for much of the material used in the preparation of this paper, has carefully studied the development and decadence of the tubercle, and divides its life into three stages:

1. The fibrous stage, which includes histologically the miliary tubercle, the diffuse and the first beginning of the nodular form.

2. The mixed fibrous and caseous stage (præcaseous), which makes the transformation from the fibrous to the caseous tubercle.

3. The caseous stage, after this transformation has been completed.

Having in mind now the specific elements of the developed tubercle, an effort will be made to trace its involution after a curative laparotomy. It is to be noted that it has been proven by Gatti's numerous experiments upon guinea pigs, rabbits and dogs, that if the operation is performed before the fibrous tubercle has reached its full development it is without effect.

To Osler seems to be due the credit of making the first histologic study of the process of healing after an abdominal incision. He found fibrous tissue holding in its meshes a few giant cells and isolated tubercle bacilli.

Pichini made a microscopic study of peritoneal tissue from a cured case, and concluded that after operation the tubercle underwent a connective tissue transformation.

Riva also found a growth of connective tissue, but observed that the process of transformation, instead of advancing from the periphery toward the center, had its beginning in the center of the tubercle.

Kischewsky, who was the first to experiment with the lower animals, concluded that the disappearance of the tubercle was due to leucocytic infiltration, followed by an active development of connective tissue. Up to this time, 1894, observers had been in accord in the belief that healing of the peritoneal tubercle is due to a fibrous transformation of the cellular elements to sclerosis. The most noteworthy work in opposition to this teaching is that of Gatti, of Turin, who in March, 1894, and again in March, 1896, reported the results of carefully conducted experiments upon animals. The abdominal sections were made at all stages, from a few days to many months after the inoculation. The tubercles, in process of healing, were examined at every stage from twenty-four hours after the operation until complete repair had occurred. A brief abstract of Gatti's findings will be of interest: During the first week after the operation an amount of reddish serous fluid exudes into the free peritoneal cavity and gradually diminishes in quantity from the first to the seventh day. The first to third days showed the peritoneum slightly reddened; the third to seventh days showed the tuberculous tissue slightly increased in volume. The vascular congestion was very slight and restricted to the periphery of the tubercles and to the normal peritoneum between them. The connective tissue showed no changes, its cellular elements being in the same ratio as before, and above all there was no proliferation of the fibro-blasts. The round cells were neither more numerous nor changed in appearance. The epithelioid cells appeared unchanged and the phagocytosis was no greater than before. Twelve days after the operation beginning hydropic degeneration of the epitheloid cells was observed, drops and rings of fluid occurring in the cells. The entire protoplasm was here and there changed into a fluid containing the floating nucleus. No increase of the fibro-blasts was present. The tubercle bacilli were somewhat more numerous; phagocytosis was not increased. Gatti further asserts that connective tissue proliferation after laparotomy seldom occurs, and only to a limited extent, and that it is not occasioned by the operation. "In general," he says, "it may be absolutely observed that the increase of the stroma goes hand in hand with the development of the tubercle. If the tubercle is really influenced by the laparotomy, and the specific irritation which has occasioned the development of the epithelioid, lymphoid, endothelial and connective tissue cells is arrested or diminished, so is the further growth of all these kinds of cells at the same time checked."

Continuing the description of the involution of the tubercle Gatti shows that, as the epitheloid cells degenerate and the fluid is absorbed, vacuoles are formed and the surrounding zone of connective tissue simply presses in to fill the space occupied by the vacuoles. Where the tubercles were already rich in connective tissue before the operation, this will be present in tolerable abundance in advanced healing; but it is only the connective tissue already existing before the process of repair began.

By the time the epithelioid cells have undergone hydropic degeneration all tubercle bacilli have disappeared from the tubercle. The reparative stages in the caseous tubercle are much the same except that the caseous masses are not absorbed, they being merely surrounded by connective tissue capsules. Cure by operation in this stage is less sure than before caseation has occurred. But even when healing does not follow, the development of the disease is usually slowed or completely checked.

The conclusion is reached that healing is not brought about by connective tissue growth, and that this error was made by the examination of cases that had fully healed. Connective tissue masses were found and the conclusion formed that healing occured by pressure upon the specific elements of the tubercle by proliferating connective tissue. Only by examining animals at all stages after the operation can the process of healing be correctly studied.

Mazzoni asserts that the healing process consists partly of increase of connective tissue and partly of a cystic degeneration. This cystic degeneration doubtless corresponds to Gatti's vacuolization due to hydropic degeneration of the epithelioid cells.

I would suggest that it is probable that tubercles can heal by either of the processes given, depending upon what force is acting, to produce disappearance of the tubercle. If the process is set up by causes extrinsic to the tubercle itself, as by an improvement of the nutrition of the patient, causing greater powers of resistance to the inroads of the disease; in other words, if the protective power of nature to wall off against danger asserts itself, as occurs in spontaneous healing, the histologic process is probably a connective tissue proliferation, with pressure upon the central specific elements of the tubercle, causing their degeneration and absorption.

If, on the other hand, the force at work is intrinsic, something that destroys the activity of the tubercle bacilli, the process would probably be a degeneration of the epithelioid cells, the consequent formation of vacuoles, and the collapse of the enveloping tissue. A moment can now be profitably given to speculation upon the force at work which brings about the healing of a peritoneal tuberculosis after an abdominal incision. Many theories have been exploited, but time does not permit even mention of all of them.

Nannotti and Baciocchi think that the operation sets up an inflammatory reaction of the peritoneum, accompanied by a noteworthy increase of its absorbing power, phagocytosis, degeneration of the cellular elements, connective tissue growth and vascularization of the tuberculous nodules, with successive fibrous transformation.

Stchegoleff attributes the curative effect of a laparotomy to a combination of traumatism of the peritoneum, thermic influence, penetration of air into the abdominal cavity, and perhaps the action of light, causing irritation followed by an inflammatory deposit.

R. T. Morris of New York concludes from experiments, that recovery after operation occurs because putrefactive bacteria produce a toxalbumen in the peritoneal fluid which is fatal to tubercle bacilli in the peritoneum. The reason it is more effective in tuberculosis of the peritoneum than in the knee-joint and elsewhere is because of the exceeding abundance of the lymphatics in the peritoneum, bringing toxic agents, which are absorbed, into close contact with the bacilli.

The theory formulated by Gatti is that the serum of the blood of a person suffering from peritoneal tuberculosis is a true antitoxin. The serum which pours into the peritoneal cavity after laparotomy comes into close contact for several days with the tubercles, destroys or inhibits the tubercle bacilli and thus is set up the chain of events which leads to complete healing.

If Gatti's description of the process of involution of the tubercle is the correct one, his theory seems the more reasonable. How much antitoxic power the serum of the blood of a person suffering with tuberculosis possesses I am not in a position to determine. Granted that it does possess potent antitoxic powers, its presence in the peritoneal cavity and its absorption by the lymphatics bringing it into intimate contact with the tubercle bacilli, would seem to explain very fully the curative effects of laparotomy.

The fact that cure does not occur if the laparotomy is done very early, before the completed fibrous tubercles have formed, Gatti attempts to explain by the fact that in the formative stage the tubercle bacilli are more resistant than they are later. I would suggest that it can very reasonably be supposed to be due to the fact that up to that time the antitoxic serum has not yet attained sufficient potency to be effective.

The fact that, in cases in which drainage is used the results are less favorable, is understood, if the cure is due to an antitoxin, for, with drainage, the antitoxin is drained away instead of being absorbed by the lymphatics of the peritoneum. The increased amount of serum thrown into the peritoneal cavity, with the greatly stimulated powers of absorption which a laparotomy produces, would cause a very large quantity of antitoxin to be brought rapidly into intimate relationship with the tubercle bacilli, causing their destruction.

In conclusion, although I do not for a moment claim that Gatti's hypothesis has been proven, it has been brought forward because it seems rational, and because it does not seem as if his work has received the recognition it deserves.

TREATMENT OF PURULENT TUBERCULAR PERITONITIS BY INCISION, WITH AN ILLUSTRATIVE CASE.

Presented to the Section on Surgery and Anatomy, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY ROBERT REYBURN, A.M., M.D.

WASHINGTON, D. C.

Modern aseptic surgery has of late years achieved many magnificent results, but in no field have these successes been so striking and wonderful as in that of abdominal surgery.

Among the later and by no means the least important of the triumphs of abdominal surgery, is the treatment of purulent tubercular peritonitis by free incision into the abdominal cavity, with thorough evacuation of all pus or septic material. Tubercular peritonitis we believe to be always a secondary infection from the tubercular bacillus, which has obtained entrance into the system, either through the digestive or respiratory organs. The following case, which recently came under the observation of the writer, is herewith given.

Was called in consultation with Dr. Wilder on Feb. 28, 1898, to see E. S. K.; mulatto; aged about 14 years. He was fairly well nourished and weighed about 110 pounds. He gave a history of exposure to inclement weather some ten days before I saw him, which was followed by symptoms of peritonitis. For four or five days he had suffered from irregular hectic fever, temperature ranging from 100 degrees to 102 degrees. On examination his abdomen was found enormously swollen, tense, and dull on percussion, and evidently filled with a large amount of purulent material. Operation by incision was advised and somewhat reluctantly acceded to. March 2, 1898, an incision one and a half inches in length was made one inch below and two inches to the right of umbilicus. Over a gallon of offensive, purulent material was thus removed from the cavity of the abdomen, and by means of an ordinary fountain syringe sterilized warm water was injected into the abdominal cavity, until it ran away again clear and without odor. A perforated rubber drainage tube was inserted in the wound. The patient experienced almost immediate relief from the operation. The abdominal cavity was washed out every twenty-four hours with sterilized warm water containing a little boric acid. After a few days this was done every forty-eight hours. His recovery was rapid and complete. His temperature in a few days fell to normal, and in three weeks he had entirely recovered.

He was carefully examined previous to the operation, and the only evidence he presented of tuberculosis was a limited dullness over the posterior surfaces of the apices of both lungs, with slight dullness on percussion and slight crackling on auscultation over the affected area. After he was convalescent, he was placed on cod liver oil and syrup of the iodid of iron, and I am informed that he is now (five months after the operation) in excellent health.

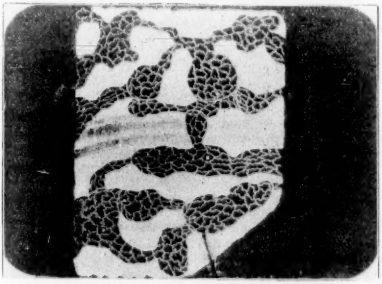
As has been well said by M. Watson Cheyne in his address delivered before the Section of Pathology, British Medical Association, at Montreal, September 1, 1897, tuberculosis, in the varying methods in which it attacks different portions of the body, presents some puzzling phenomena. As we all know, tuberculosis (the white death) in its various forms, causes about one-seventh of the entire number of deaths that occur annually from all diseases. Yet how varying is the progress and fatality of tuberculosis when it occurs superficially upon the skin as in lupus, when it occurs in the cervical glands, when it occurs in the lungs in the form we too well know as phthisis pulmonalis, or when it attacks the serous membranes of the abdomen and causes the disease known as tubercular peritonitis.

The life history of the bacillus tuberculosis as it is found in cases of lupus of the skin, would seem to indicate that it is not as virulent as many other pathogenic organisms. Cases of lupus are slow in progress, often exist for many years, and frequently only cause death when the patient's lungs become infected with the bacillus, thus causing phthisis pulmonalis. Why does this slow progress and fatality exist in lupus when contrasted with the acute and rapid infection of the system that we find in acute phthisis, or as it is often called, galloping consumption?

We believe that the true explanation of this is the nature of the tissues involved. When these bacilli

infect the skin, the irritation produced by them produces a layer of tissues around the bacilli through which they are often unable to pass, and the system is this way protected from their inroads. The same phenomena are often seen in postmortem examinations, on examining the lungs of persons who have died from other diseases than pulmonary consumption. In fact it has been conclusively shown that the vast majority of all persons, who die from any cause, after the age of 60 years, at some period or other of their lives have had deposits of tubercle in in their lungs. These deposits of tubercle in the lungs often become surrounded or encapsulated by fibrous tissue, or may undergo calcareous degeneration and remain dormant during the lifetime of the individual. Unfortunately, however, this is not the usual history of tuberculosis of the lungs. The final destructive series of changes occurring in the lungs in phthisis pulmonalis, are due, not so much to the destruction caused by the bacillus tuberculosis, as to the infection of the system caused by the development and growth of myriads of pus-producing organisms, which attack the pulmonary tissues already weakened by the inroads of the tubercle bacilli.

The hectic fever with the debilitating sweats which



Lymphatic glands of peritoneum (rabbit).

accompany the later stages of phthisis pulmonalis, is evidently a septic infection by pus organisms. Tubercular infection of the peritoneum, however, in its rapidity of progress presents a marked contrast to most other forms of tuberculosis. As much damage may be done to the organism in a few days during the course of a case of tubercular infection of the peritoneum, as may be done in months or even years by other forms of tubercular disease. Why is this? The explanation of this is easily given by taking a look at the illustration accompanying this article, which is copied from J. Burdon Sanderson's Hand-Book for the Physiological Laboratory. The peritoneum, in fact in man and all higher animals, contains an immense mass of lymphatic glands and vessels, which probably comprise nearly one-half its area.

Absorption then from a structure of this composition goes on with immense rapidity, and putrid material of whatever kind, when it reaches the peritoneum, soon accomplishes its deadly work. Every physician knows how rapidly patients sink and die from the deadly peritonitis which follows perforation of the intestine in typhoid fever. Cases of abdominal surgery also where blood or serous exudation have escaped into the cavity of the peritoneum, and have not been removed at the time of the operation, rapidly prove fatal from the same cause.

The treatment of purulent tubercular peritonitis by incision, either with or without drainage, is now thoroughly established by the record of such a large number of successful cases, that it is almost universally admitted by surgeons to be the proper procedure. An interesting query arises, how does the simple operation of incision cure? Many explanations of this have been given; some have believed that the entrance of air during the operation carried in at the same time other micro-organisms, which waged war upon and destroyed, by the formation of toxins, the tubercle bacilli. Other fanciful explanations have been given, which it is needless to repeat, but the true explanation is believed by the writer to be simply the bactericidal power of the lymph and blood serum which continually bedews the surfaces of the peritoneum.

As soon as the purulent material is evacuated from the abdominal cavity by drainage and thorough washing with sterilized water, the number of tubercular and other pathogenic bacilli present on the surface of the peritoneum, is reduced to a minimum. Nuttall has shown that the blood serum powerfully attacks and destroys all pathogenic bacteria and other harmful micro-organisms with which it comes in contact, and the living organisms become the victor in the fight, provided that the number of the invading micro-organisms is not too great. The battle between the hostile micro-organisms and the blood is just like that between two opposing armies. If the host of micro-organisms is not too numerous, the blood by the bactericidal power of its serum, vanquishes, and the result is the restoration to health, but if the powers of the system be weakened by any cause, or the number and virulence of the invaders are too great to be overcome, the pathogenic micro-organisms become victorious and the result is death.

SOCIETY PROCEEDINGS.

Michigan State Board of Health Quadri-Centennial and Conference of State and Provincial Boards of Health of North America.

Held at Detroit, Mich., Aug. 9, 10 and 11, 1898.

FIRST DAY.

The sessions of the first day were devoted entirely to the quadri centennial of the Michigan State Board of Health.

The session was opened with prayer by Rev. JOHN MCCARROL, the delegates joining in the recitation of the apostles' creed.

The president of the State's health board, FRANK WELLS, then made his annual address. Among other things he said:

"The last quarter of the century has been notable for the development of two sciences, biology and sanitation. The application of this knowledge to the saving of human life and the prevention of human suffering has kept misery and despair from entering countless homes. The honor and applause which everywhere greet the warrior who is moved by patriotism and duty to noble deeds is justly due to Dewey, to Shafter, to Sampson, to Schley and to Hobson. Shall we not place, side by side with these worthies, to be equally remembered with gratitude the names of Pasteur, of Lister, of Koch?

Mayor MAYBURY welcomed the delegates and remarked that they had come to a city where the doctors do not live by curing diseases, but by making the healthy healthier. Residents of Detroit, affirmed the mayor, have on an average from ten to fifteen pounds more advoirdupois than the inhabitants of other cities.

Dr. GIBBS, Detroit's health officer, spoke for Gov. Pingree. In lauding the beauty of the city, Dr. Gibbs feelingly averred

that for him there was only one more removal to make, and that was from Detroit to heaven.

The first paper on the program, entitled "A Quarter-Century of Sanitary Work," was by A. N. BELL of Brooklyn, N. Y., but in his absence was read by Dr. Henry B. Baker.

This was followed by an address from Chicago's health commissioner, ARTHUR R. REYNOLDS, on

PUBLIC HEALTH WORK IN MICHIGAN.

His address showed how readily a naturally dry subject might be made exceeding attractive to the public. A summary of his remarks is as follows: What God hath wrought through this Board is told in the statement that between 1890 and 1896 nearly 150,000 cases of sickness were prevented and more than 7000 lives were saved from premature death through the advice, instructions and supervision of the Board. It is not too much to say that the State Board of Health of Michigan has, in the language of our great classic in hygiene, Edmund Parkes, made growth more perfect, decay less rapid, life more vigorous, death more remote for every citizen within the boundaries of this fair State. At first blush it may seem that the field of usefulness of a State board of health is a narrow one. On reflection, however, we will discover that its function is as broad as civilization itself. It follows the citizen in all his dealings, through all his days. It begins at his birth, it has him under observation, whatever his mission, through all his life to its close, and it keeps careful vigil at his grave until the last vestige of his remains is crumbled into the dust whence it came. Every incident that lowers the vitality, that depraves the mind or that whets an abnormal appetite calls for its interference. It holds no despot's sway to club mankind along paths that are hard. It only asks that he be normal. It teaches no abstruse philosophy, but offers hope and regeneration to the weak.

In this work of sanitation there is nothing of the spectacular. There is none of the inspiration and the glory that reckon with a nation saved or a foe repulsed by feats of arms. Nevertheless, those who study understand that the proper appreciation of sanitary science defeats man's most relentless foes, and that neglect or defiance of her laws has brought destruction to nations in all time. If unhappy Spain had no other sin than that of having maintained at our doors a preventable breeding-place for yellow fever, she richly deserves the wrath that has been visited upon her. The greatest number of deaths in the centers of population is caused by diseases of the nervous system, the worry diseases. The number is steadily increasing year by year, and this increase is due to the keenness of commercial competition and the fierceness of the struggle, not alone for existence, but for wealth. It is an almost universal rule that those who have labored and worried beyond their endurance leave a generation of weaklings to fritter away their substance and ultimately to pass from history forever. The lesson to be learned and the lesson that must be learned, is to stop fretting and stewing one's self into the grave, to leave a pitiful physical and mental inheritance to one's children. Natural law intends that man shall live and be useful, and not that he shall be degenerate or dependent, or that he shall prematurely die. The world is for man and his upbuilding, for the developing of his mental, moral and physical stature. The future sanitarian will broaden out upon this basis. He must educate the masses upon the known laws of reproduction and enable human beings to improve their breeding as the farmer improves all domestic animals by proper mating.

The remedy for the social evil that leaves such human wrecks in its wake must come through a thorough dissemination among the public of knowledge now chiefly held by those of the medical profession. Let parents and their daughters once fully understand the jeopardy girls are placed in by marriage with men who have lived reckless and impure lives, and there will be less need for surgeons to practice their art upon women in future. Let all understand that much of this danger and disease has its incentive in the semi-delirium caused by intoxicating drinks. When this is generally understood the young man who is known to be a rounder will not be hailed as a jolly good fellow, but as an evil thing to be shunned, as was the leper in the days of old.

But neither the sanitary millennium nor the social and economic millennium, nor the millennium of peace has yet arrived. Hellish war is still waged by civilized people and in the name of both God and the law, men are still legally marshalled out for slaughter. Sanitary science believes in war; but its warfare does not tend either to brutalize or to destroy life, but to save it, and to elevate it. Sanitarians believe in the war that regenerates and refines; the war for the defeat of satan and the enthronement of Immanuel; a war whose weapons are reason, sweetness and light. To all who serve in such warfare in this State, and to those who have brought sanitary work to its present perfection, I offer my most respectful homage. It is the Master's work, and I bid you Godspeed.

SANITARY WORK TWENTY-FIVE YEARS AGO

was then presented by Prof. R. C. KEDZIE, M.D. It was also put entertainingly.

At the afternoon session papers were read on the "Educational Work of the Michigan State Board of Health," by Prof. A. C. Lindsey, dean of Yale's medical faculty; on "Sanitary Conventions," by Benjamin Lee, M.D.; on "Annual Conferences of Local Health Officers," by C. O. Probst, M. D.; on "State Work for the Restriction and Prevention of Diseases," by John S. Fulton, M.D., and on "Municipal Restriction of Diseases," by Ernest Wende, M.D., Buffalo's Health Commissioner.

The evening session was occupied in five-minute addresses by various prominent sanitarians, among them Felix Formento of New Orleans, Hon. Le Roy Parker of Buffalo, Hon. John Avery of Greenville, Mich., Peter H. Bryce of Toronto, D. E. Salmon of Washington, J. N. McCormack of Bowling Green, Ky., C. L. Wilbur of Lansing, and J. N. Hurty of Indianapolis, and was followed by a reception and banquet.

SECOND DAY.

The morning session was occupied with the annual reports of the officers of the organization, presented by Benjamin Lee of Pennsylvania, president; Felix Formento of Louisiana, vice-president; Eleazar Pelletier of Quebec, treasurer, and J. N. Hurty of Indiana, secretary.

The report of the Secretary, Dr. J. N. HURTY of Indiana, showed an increase in membership for the year of three, one from Mexico and two from Canada. Secretary Hurty recommended that the conference adopt the old constitution of the national conference of boards of health, whose title was changed to the present one at the Nashville meeting last year. This was done with the exception of the annual dues clause, which is left to be prorated according to expenses.

The treasurer, Dr. ELEAZAR PELLETIER of Montreal, reported the reduction of debts left from the Nashville meeting of last year from $357 to $100.

The conference adopted a resolution asking compilers of vital statistics in the United States, Canada and Mexico to use the Bertillon system of making mortality census returns.

A by-law was adopted making it mandatory that on each alternate year the conference meet in Washington, on the ground that the attendance would be greater if a regular meeting-place were adopted.

After these business matters had been disposed of the convention settled down to the discussion of three questions suggested by the session yesterday, viz.: What are the principal lines of work of your board? How is each accomplished? What modification, if any, does the experience of your State suggest?

Dr. E. D. CROWLEY of Oakland, Cal., stated that the work of the State's health board is being vigorously pushed along three lines: The prevention of the spread of tuberculosis; the prevention of Texas fever in cattle, carried in from outside by the tick, and lastly, sanitary control over the State's harbors. In their efforts to stamp out tuberculosis in cattle, proposed legislative measures have been defeated again and again by a combine of wealthy cattle owners.

Professor LINDSLEY of Yale University spoke for Connecticut. The State Board there, he stated, had only advisory powers. The law governing sanitary measures in his legislature, he said, was to follow, never to lead, while the work of enlightening the public mind on sanitary reforms was like teaching a school where there were more truants than teachers. However, after twenty years' persistent work, the board is endeavoring to secure thorough sanitary administration in every town; to tabulate and publish vital statistics and have a thorough microscopic examination made of all water used for drinking and boiling purposes. One system of sanitary rules prevails in every town, and a county health officer is clothed with administrative power to see to their enforcement.

Delaware was represented by Dr. E. W. COOPER, who said his State Board was clothed with absolute power on its own inspection or on notice of grievance. It meets semi-annually and provides for a sanitary inspection throughout the State twice a year. Local boards are clothed with the same power as State boards, and education of the public along sanitary lines is carried on by means of circulars and public meetings held frequently.

Dr. J. A. EGAN, who represented Illinois, drew a picture of the State's sanitary condition. There is no mandatory statute enforcing the creation of local boards, and the business of the

State Board seems to be mainly the examination of doctors and midwives. No State Board of examining physicians is provided for. In one city of 15,000 population there is no health board, only a sanitary policeman, and disease runs rampant.

Dr. J. N. HURTY, for Indiana, said that the work of its State Board was hampered by defective legislative mechanism. Sanitary work is all crowded upon the secretary, who already has petitions from 250 towns asking him to come and investigate deplorable conditions.

At noon the delegates, with their ladies and guests, took cars for Parke, Davis & Co.'s laboratory, where luncheon was served. After a tour of inspection, the party were transferred to a steamer in waiting and given a ride to St. Clair Flats.

At the evening session the conference listened to a paper by GARDNER S. WILLIAMS, engineer of the Detroit water-works, on

PURIFICATION OF SURFACE WATER,

the opening wedge for a lengthy discussion. The paper was of necessity somewhat technical, dealing with experiments made with various purifying processes in relation to sewerage and bacteria, especially the typhoid bacillus. Mr. Williams stated at the outset that Detroit had never gone into the matter of purifying its water to any great extent, and he was therefore unable to give any extended local experiments. He referred to the development of purification of water in various countries, with copious explanations of the different processes. One of the points he made was that chemic analysis alone is not sufficient to show all the impurities of any certain water, but must be taken in connection with all available data concerning the source of supply, so as to establish a standard from which deductions can be made with any degree of certainty.

The question of filtration came up in connection with the main topic, and Dr. HURTY of Indianapolis, presented a number of stereopticon views of filtering plants, the most important of which was the sand filter in operation at Lawrence, Mass.

Mr. WILLIAMS did not commend the efficiency of mechanical filters, on the ground that they have not yet reached a stage of perfection rendering them thoroughly reliable, but they were championed by several physicians, who held that they not only gave satisfactory results, but were a necessity in small cities, where the first cost of the plant was the main question to be determined.

Dr. BRYCE of Toronto, said that one of the greatest factors for good water was the keeping of water in its state of natural purity.

THIRD DAY.

The Conference of State and Provincial Boards of Health closed its sessions with discussions on tuberculosis in all its phases. The walls of the convention were hung with maps showing that this insidious disease has killed more people than any other. Dr. Hurty of Indiana said one-seventh of all the deaths are caused by it. William Bailey of Kentucky declared that 1,200,000 people annually died from tuberculosis, and said that if sanitarians were but given the opportunity to fight the disease the saving would easily pay the country's pensions; that in two or three months the interruptions to commerce from the disease represented at least $100,000,000.

After tracing the tubercle bacilli from its origin to the height of its growth in man, the conference discussed means of prevention. Discussions on this point ranged from "Care of Expectoration" to "State and Municipal Care of Consumptives."

The conference elected the following officers: President, of Toronto; secretary, J. N. Hurty of Indianapolis; treasurer, Felix Formento of New Orleans; vice-president, P. H. Bryce Eleazar Pelletier of Quebec.

PRACTICAL NOTES.

To Remove a Foreign Body from Under the Nail.—Alternately soften the nail with the end of a match dipped in caustic potash and scrape with a piece of glass until the object is reached.—*Journal de Méd. de Paris*, July 3.

Vesical Asthma.—One of the manifestations of autointoxication consequent upon hypertrophied prostate, is distress in breathing, which can only be relieved by emptying the bladder. *Semaine Méd.*, July 6.

Salt as an Antiseptic.—According to the *Cronica de Ciencias Médicas de Filipinas*, the insurgents dress wounds with dry salt or strong brine, from lack of the usual antiseptics, and wounds from firearms heal under it in four to five days.—*Semana Médica.*

For the Disinfection of Sponges.—Sponges can be boiled without injury in 30 per cent. prophylic alcohol, Saul announces in the *Munich Med. Woch.* of June 14. He boils them two hours the first time; afterward thirty minutes. Anthrax spores are killed in ten.

Jequirity in Ozena.—Jequirity proved effective in a number of cases observed by Dr. C. Uriarte, that had resisted all other treatment. The after-effects vary with the individual and are transient, never serious. He uses it in a powder or salve, or in a 10 per cent. solution.—*Semana Méd.*, June 16.

Foreign Bodies in the Air-Passages.—Heller reports a number of serious cases in which prompt irrigation of the naso-pharyngeal space produced such efforts at expectorating or coughing, that the foreign body was expelled at once and life saved. He urges all to try this simple measure before resorting to tracheotomy.—*Munich Med. Woch.*, June 28.

Champhor Bromid in Chorea.—Bourneville and Katz describe a severe typic case of Sydenham's chorea rapidly cured with camphor bromid, increasing from 2 to 9 grams a day, March 9 to 22, again decreasing to 2 by April 6, confirming their previous announcements of its remarkable efficacy. The *Progrès Med.*, July 16, contains cuts of the handwriting, during treatment and after it had become quite normal again, the final evidence of cure.

The Toxicity of Camphorated Beta Naphthol.—This has been established by Le Gendre and Desesquelle, who announce that the stomach will bear quite a large amount, if diluted in an inert liquid. The maximum for an adult is 1 c.c. a day. Injected into the peritoneum the daily maximum for an adult is 5 c.c. It can be incorporated with cocoa butter for a suppository; maximum 35 centigrams a day. The absorption is always slow, and as the camphor is most soluble, the toxic accidents that have been observed were probably due to the camphor.—*Presse Méd.*, June 22.

Abrashanow's Method of Amputatio Femoris Intercondylica.—This method consists in sawing off the rear half of the patella, leaving the tendon still attached to the front, and after sawing off the lower end of the femur, cutting an oblong piece out of the posterior upper end of the tibia. The lower edge of this piece is then brought up to fit against the patella, while the long front edge fits the whole length across the stump of the femur. All the sawed surfaces are thus brought into juxtaposition, and the natural posterior surface of the upper end of the tibia, which has no bursa, forms the stump.—*Cbl. f. Chir.*, July 2.

Echinococcus of the Liver.—R. Lennhoff describes some observations (*Deutsche Med. Woch.*, June 30) which prove that an echinococcus can be differentiated by a peculiar furrow that accompanies each deep inspiration when the patient lies on his back. The abdomen rounds up smooth below the sternum except during inspiration, when the characteristic furrow between the sternum and the tumor attracts attention. A test puncture confirms the diagnosis. The patient should lie on his face a while before the removal of the cyst to dislodge the heavier contents from the rear.

Ox-gall in Biliary Lithiasis.—L. Gautier of Geneva has found that the prolonged administration of beef gall in small doses increases the solubility of the cholesterin and hence prevents the formation of gall-stones. He uses an extract reduced to one-tenth, decolorized, sterilized at 104 to 105 degrees C., combined with an inert powder, to make a pill containing 10 centigrams, one pill at the two principal meals. Patients formerly tormented with hepatic colic have no return of their attacks with this medication, which he continues or suspends according to indications.—*Semaine Méd.*, June 29.

Coagulating Injections for Erectile Tumors.—T. Anger has been using the following solution for this purpose for thirty years, with most satisfactory results: Water, 60 grams; sodium chlorid, 15 grams, and ferric chlorid, 25 grams, at 30 degrees C. He injects two to twenty drops in a small angioma and twenty to forty in larger ones, proceeding very gradually and limiting the injection to the part infected by peripheric compression of the tumor, left undisturbed for fifteen minutes afterward. The tumor subsides very slowly. If it has not all disappeared in three to six months he repeats the injection.—*Sem. Méd.*, July 6.

Success of Artificial Serum in Lead Colic.—The first indication is to purge and carry off the accumulated metal, but this is extremely difficult to accomplish, as purgatives usually refuse to act for several days. Prof. A. Delearde now announces that he has found that one injection of artificial serum will produce a copious diarrhea at once when there is lead intoxication, although in all other conditions it affects the kidneys, not the bowels. He considers it probable that the chlorid of sodium combines with the lead to form a soluble chlorid of lead, to which the prompt purging action is to be ascribed, which at once cures the pain, vomiting and headache. Paralysis is not affected.—*Nord Med.*, July 15.

Treatment of Strabismus.—At the July meeting of the Paris Academy of Medicine, Dr. Panas communicated some observations on this subject. He said that the squinting eye was the one which deviated most from the line of vision. Nevertheless strabismus was only apparently unilateral. If the phenomena accompanying this condition were analyzed in detail it would be found that the strabismus was always bilateral, and if it appeared unilateral that was because the patient only used the eye which was least affected, and in overcoming the deviation of this one exaggerated the obliquity of the other. As for therapeutic measures, Dr. Panas held that as the affection was bilateral there must be a bilateral operation. In 230 cases Dr. Panas performed tenotomy of both internal recti, and stretched them in addition, thus lessening their tendency to overaction. Dr. Panas never performs advancement, finding a simple tenotomy sufficient. In 220 cases he had never seen any overcorrection, or if there were a little it was only temporary. Of 220 convergent cases of strabismus, he had 190 in which the result was immediately successful. In those which were unsuccessful the result was not overcorrection but undercorrection. In ten cases Dr. Panas rectified this by advancement of the antagonistic muscles and in every case with success.—London *Lancet*.

The Laborde Treatment of Chloroform Asphyxia.—Herzog of Charkow has recently published in the *Deutsche Zeitschrift für Chirurgie* some experiments made according to Dr. Laborde's method (*vide* JOURNAL, Vol. xxx, p. 361, Feb. 12, 1898) of producing resuscitation in cases of chloroform and ether asphyxia by rhythmic traction of the tongue. The effect of making traction on the tongue is to stimulate its sensory nerves, and to bring about reflex contraction of the respiratory muscles through the medium of the central nervous system. Dr. Laborde recommends that the tongue should be seized firmly, and traction be made about twenty times in a minute. Up to the present time twelve cases have been recorded in which this method proved successful in asphyxia from anesthetics. For the purpose of testing Dr. Laborde's conclusions, Herzog made a series of experiments on dogs partially asphyxiated by means of large doses of chloroform and ether and found that, in nineteen cases, respiration was restored spontaneously in six, but that traction of the tongue was only successful in resuscitating three of the remaining thirteen. In these three instances the animals began to breathe again after traction had been made twelve times, and their recovery was complete; in two other cases respiration was restored, but the cardiac action nevertheless failed, and although the respiration was kept up for sixteen and six minutes respectively the pulse did not rally and the animals died. The results obtained by Herzog are thus at variance with those of Dr. Laborde, who obtained resuscitation in the great majority of cases. It is probable that Dr. Laborde commenced to make traction of the tongue at an early stage, when the animals were still capable of recovering spontaneously. The asphyxia obtained in Dr. Herzog's experiments always occurred in the last stage of the narcosis. Asphyxia in the early stage of the narcosis, while it is so frequent in the human subject, could not be obtained in the experiments on animals. Herzog concludes that Dr. Laborde's method is not reliable in the asphyxia of the last stage of narcosis, but that it may be tried as an auxiliary to other methods in the primary steps.—London *Lancet*, July 9.

Ureteral Surgery.—A recent editorial in the London *Lancet* treats of the above subject especially on the lines indicated in the last Hunterean Lectures on "The Surgery of the Kidney," delivered by Mr. Henry Morris. If the recent advances in the surgery of the kidney have surprised those accustomed to the old order of things, the modern surgery of the ureter excites still more astonishment. Numerous operations are now performed on the ureter, a structure which was quite recently considered to be wholly beyond the possibility of surgical interference. The first, and probably the most important, operation performed was ureterotomy for calculus, and though the operation is still rare, it has been done by several surgeons, and stones have been successfully removed from all parts of the ureter, from the pelvis of the kidney to the opening into the bladder. Strictures of the ureter have been relieved by ureterotomy, and in some cases a portion of the tube has been excised, with results which fully justify the operation. Ureteral anastomosis and ureteral grafting have received much attention in consequence of the frequency with which the ureter is involved in the operation of vaginal hysterectomy. Formerly the only hope which could be held out to a patient suffering from ureteral fistula after such an operation was nephrectomy, but ureteral anastomosis and grafting bid fair to entirely replace this severe procedure. A still more extensive operation on the ureter is excision. It is only called for in cases of widespread and persistent disease, but it has been successfully performed for tuberculosis and other conditions of the ureter. Another subject closely allied to the above is that of obstructive anuria. It is very rarely indeed that both ureters are simultaneously blocked by calculi. In most cases one kidney has been destroyed or rendered functionally useless by a stone, and then later, when the other kidney has taken on the double duty, it too, has had its ureter blocked by the impaction of a renal calculus. The symptoms which follow are identical with those met with after experimental ligature of both ureters in animals, and usually the symptoms which are commonly called "uremic" are absent. The patient survives a few days, perhaps as many as ten, and then dies. The fatal ending is inevitable unless the obstruction is removed. It has taken many years for it to be generally recognized that obstruction of the intestines can not be cured by the lavish administration of purgatives and that the obstructing cause must be removed or the bowel opened above the obstruction. In the precisely analogous case of obstructive anuria, diuretics and exercise are still only too often relied on for treatment, and a patient is allowed to succumb when an operation would have saved him. It is true that the percentage of spontaneous removal of the obstruction is greater in the case of the ureter than in the case of the intestine, but the principles involved are the same, and an operation should be performed as soon as the diagnosis is established. The lectures were illustrated by an elaborate set of tables of operations on the kidney, which must prove of great value in the preparation of statistics on this subject.

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SATURDAY, AUGUST 20, 1898.

BLASTOMYCETIC DERMATITIS.

In July, 1896, Dr. GILCHRIST[1] described a case of skin disease, in which he found yeast fungi or blastomycetes. In March, 1898,[2] he published an extensive report of an additional case, and in the same month Dr. H. G. WELLS[3] of Chicago, published a case from the surgical clinic and pathologic laboratory of Rush Medical College.

The *Indiana Medical Journal* for August, 1898, contains a report of a case by ROBERT HESSLER of Indianapolis. This concerns a thoroughly healthy man who, in October, 1897, received a slight cut while being shaved. This was situated in the neck, just under the chin, and on a line with the right angle of the mouth. Healing took place, but was followed by the development of an oval-shaped papule as large as a half-grain of wheat. This nodule was freely movable, hard, and remained stationary until January 10, this year, when it was noticed that it had become larger and was surrounded by an inflamed, slightly elevated area. Shortly after this it "came to a head." The surface was then cleansed, opened aseptically, culture-tubes inoculated and smear preparations made.

With EHRLICH'S neutrophile stain there were found, in the interior of the leucocytes, characteristic yeast cells of a brownish color and slightly oval outline. Many of the organisms were in the budding stage. The agar tubes which were inoculated presented in a few days pure cultures in the form of small, bright, white colonies. The course of formation of daughter cells by means of budding could be followed readily in hanging drop preparations. When the organism was cultivated on solid media for a longer time, Dr. HESSLER speaks of the appearance of characteristic fungus threads. As seen in stained preparations the single organisms are slightly oval, with a clear outer envelope and with differentiated contents.

Although the micro-organism is smaller than those described by GILCHRIST, Dr. HESSLER has concluded that it concerns a blastomyces, and in this opinion he is confirmed by Professor WELCH of Baltimore, who has seen the cover-glass preparations.

The scar that formed after opening the abscess was much greater in extent than is ordinarily the case with similar abscesses due to the common pus microbes, and of late it has been noticed that a new papule about three-fourths of an inch from the site of the first one has appeared.

Now that the attention of the dermatologists and physicians in general has been called to the fact that blastomycetes may cause extensive lesions of the skin in various parts of the body, which, speaking generally, often resemble certain forms of tuberculosis of the skin, and which have therefore in some quarters been called instances of pseudo-tuberculosis, it is to be expected that many cases of this kind, which have heretofore been erroneously diagnosed, will be placed in their proper category.

[1] Johns Hopkins Hospital Bulletin, 1896. Johns Hopkins Hospital Reports, Vol. i.
[2] Journal of Experimental Medicine, 1898.
[3] New York Medical Journal, March 26, 1898.

NEUROLOGIC NOMENCLATURE.

It is a question for psychologists how far thought is possible without words, but it is a matter of common every-day experience that words are an essential in the conveyance of thought. They are tools, however, of varying convenience and value, according as they are properly chosen and fitted to the idea which they are intended to convey. The amount of extra labor that is involved in the expression of our thoughts by the lack of a suitable intelligible terminology is not readily calculated, but nearly every one has felt the mental strain of labored circumlocution when the proper terms were unknown or did not readily come to hand. It would be an interesting problem, if it were a possible one, to figure in terms of horse-power, let us say, the extra amount of energy required to express the daily range of ideas in a language like the German over that required in a less involved and complicated one, the English for example. With equal populations using the two it is easy to believe that the extra work could it be translated into motor power would be very real and appreciable by every ordinary intellect. When we consider the other methods of conveying ideas, we can still further magnify our estimate of wasted labor and add to it the oceans of ink that it is almost a justifiable exaggeration to say have been expended over and above the increased manual labor of writing, itself a tremendous strain in the aggregate.

It may be there is some compensation for this, that a clumsy language only affords a healthful gymnastics

for robust intellect, but it does not after all speak well for the intelligence that rests satisfied with imperfect methods or appliances when better ones are available. Sometimes it is an inert conservatism that perpetuates them, sometimes a sentimentalism that in its best aspect is only halfway respectable keeps them in vogue. It seems also to many people a small matter to continue to endure abuses to which they have grown accustomed, and utterly needless to try to rectify them. When the evils are only a few extra and ill-adapted words or clumsy constructions of speech, the average man hardly thinks enough to feel their inconvenience.

How far science has suffered from the want of a convenient, economic and accurate terminology it is hard to say, but that it has suffered is not a matter for dispute. Our scientific terms, especially in medicine, have developed haphazard by accretion, and a really scientific system of nomenclature appears to have been about the last thing thought of. When the attempt has been made to make the terms descriptive the result has been mainly to make them cumbrous, and, in fact, it is impossible to have it otherwise. What is needed is a practical, brief, concise and easily adapted and utilized nomenclature, and this should be the aim.

The terminology of what may be called the finer gross anatomy of the central nervous system is the creation of the last thirty or thirty-five years at the most, but it has at present most of the defects of older systems, and it is safe to say is unintelligible to a large extent to the great mass of practicing physicians. Even the students that annually go out from our medical colleges have a very inadequate acquaintance with it as a whole, and probably soon forget a large part of that they have. Many of the terms in use are duplicated or triplicated, many more are needlessly cumbrous; as a whole there is no uniform plan or system. To read understandingly an elaborate anatomic paper on the nervous centers requires sometimes, nowadays, a knowledge of the terminology of the subject in two or three languages, so varied are usages of authors.

In the nomenclature of the Royal College of Physicians, which was adopted many years ago by the AMERICAN MEDICAL ASSOCIATION, and which is subject to decennial revision, the Latin, French and German equivalents are given.

For a number of years Dr. B. G. WILDER of Cornell University has been endeavoring to bring into use a simplified and consistent system of neurologic nomenclature, and the terms he has proposed have in many instances been adopted by prominent neurologists and seem likely to come into general use. A recent and exceedingly meritorious work, that of Dr. MILLS, adopts his system throughout, with the result that it affords almost the only consistently systematic nomenclature in any treatise of its kind on the disorders of the nervous system. For this reason, however, it has been severely criticised, the average conservatism of the time reacting against what seems to it an innovation. Dr. WILDER'S nomenclature has in it much that may seem novel, but its terms have the merit of brevity, are fully as descriptive or locative as those hitherto in general use, and the charge of cumbrousness that has been thoughtlessly made against them in some of these criticisms has least of all a valid basis. Its adoption by Dr. MILLS is to be considered as an advance and an advantage rather than a disadvantage to his book, for even if the terms do not all of them come into general use, most of them probably will, and the work will be therefore all the more in the front rank of medical literature.

The need of a uniform and improved system of medical nomenclature generally is shown by the appointment of committees of anatomic societies here and abroad for its better regulation. That this is a favorable sign of the times will be admitted, and each movement of the kind has its influence in bringing about the desired result. The final perfected nomenclature will probably be to some extent an evolution, but all these preliminary attempts will have their influence in bringing it about, and probably none of them will be more influential in regard to nervous terminology than the elaborated and consistent system of Dr. WILDER, however much objectors may criticise and temporarily prevail. It is only an extreme conservative who will not desire something better and more consistent than the cumbrous, arbitrary and polynomial nomenclature now in use.

THE URINE OF THE MALARIAL FEVERS.

Even when no specific action of the causal factor of this disease is exerted upon the kidneys, the urine of malarial subjects varies somewhat with the type of infection, whether regularly intermittent or estivo-autumnal, as well as remaining to a certain degree subservient to physiologic influences, as amount of fluid ingested, season, climate, time of day, and the other usual considerations. In not a few cases, however, and it must be confessed that these are almost universally of the estivo-autumnal variety, the kidneys suffer severely, either in the production of an acute nephritis, or in the hemoglobinuria of pernicious ague, or both. Again, a former attack or attacks of ague may have gradually produced a chronic nephritis, upon which an attack of pernicious estivo-autumnal fever has engrafted an hemoglobinuria, as in the case reported by BROWN ("Malaria;" report of twenty-eight cases), in which granular and epithelial casts were found in addition to red corpuscles and "shadows;" the specific gravity in this case averaged 1010.

Let us first take up the urinary changes present in the average number of ordinarily severe cases. The daily amount varies as to whether a paroxysm has occurred on the day in question or not, for at the beginning of a paroxysm it frequently happens that a considerable amount of urine is passed. The quan-

fity also varies with the type of infection; in the regularly intermittents it is somewhat increased, while in the estivo-autumnal infections, when they cause a fever almost continuous in its action, the urine, as in all continued fevers, becomes diminished. When convalescence is established, usually several days after the last chill, a slight polyuria is often manifest; this rarely exceeds four pints and may last a few days or weeks, depending as a rule on the severity of the attack. As regards acidity, one would naturally expect that in fevers, concentration of the urine, other things being equal, would increase the acidity. This is true in the malarial fevers, except in cases of the estivo-autumnal type, where the urine is not altered in this regard. The color varies greatly; where fever is present it is high, and the higher the fever the deeper the color. This fact depends upon two causes: the concentration that occurs in all febrile processes; the chill with subsequent fever is coincident with the destruction of large numbers of red corpuscles, and at that time a large amount of pigment, transferred hemoglobin, is set free in the blood, to be immediately taken up by the leucocytes; while a part of this pigment is deposited in the various organs, especially the liver, no inconsiderable amount finds its way to the kidneys and appears in the urine as urobilin, which substance itself would lend deep coloring to the urine. Some cases of malaria show a jaundice more or less marked; this may vary from the slightest perceptible tingeing of the conjunctivæ to a deep yellow, the very dark colors so characteristic of obstruction never occurring in uncomplicated cases. This jaundice is always remotely hematogenous, a greater number of red corpuscles being destroyed than can be elaborated by the excreting organs; it occurs as a rule only in the severer cases, usually estivo-autumnal in character, cases in which not infrequently hemoglobinuria has supervened. In such instances bilè coloring matter may be proved to be present in the urine by means of the ordinary nitric acid contact test.

As stated above, the jaundice is only remotely hematogenous; that is to say, it only primarily depends upon the destruction of the red corpuscles. The pigment is in large part carried to the liver and a great increase in the secretion of the bile occurs so as to rid the overcharged system of as much deleterious matter as possible. Indeed, the secretion is often so great that all cannot be disposed of through the excretory ducts; a backward pressure then occurs and reabsorption, with the production of jaundice, readily follows. In the icteric attacks, bile is not very apt to be in the urine, as the kidneys very probably are able to transfer into urobilin some of the biliary compounds. It is only when the latter are in great excess that the presence of bile can be proven. As in other febrile affections, with a diminished excretion of fluid from the kidneys, there is a normal or increased amount of solids, so that during the paroxysms the specific gravity is increased, while in the intervals it is diminished, so that the total amount passed maintains a fairly good average, from 1045 to 1018. When infection is from the estivo-autumnal parasite, and the attack of sufficient severity to cause a continuous fever, the specific gravity, of course, remains permanently high. As concerns the various normal ingedients of the urine, urea and uric acid are increased as are the various salts, phosphates, chlorids and sulphates. The striking feature about this increase is that it is especially manifest during the post-malarial stage, the period of polyuria.

Another point of interest in the solid constituents of the urine is the increase in the amount of iron. This is augmented in any febrile disease, but more so in malaria than in any other. The increase is particularly liable to be noticed after a paroxysm, and is undoubtly dependent upon the excessive destruction of red corpuscles. The sediment of malaria is unusual from but one standpoint and that is best brought out by the use of the centrifuge; the presence of black pigment occasionally of such quantity as to produce a heavy deposit in the bottom of the tube as in the case reported by Forchheimer. Among abnormal ingredients that might appear the first place must be allotted to albumen. In all febrile affections a varying proportion of kidneys suffer, some from temporary changes, as manifested by the presence of albumin and casts which gradually disappear after the cessation of the original disease; while others are the subjects of acute inflammatory processes which do not answer readily to treatment and which finally become chronic. In such a disease as the one under consideration, where specific organisms are present in the blood, naturally the delicate epithelial structure of the kidney would be almost certain to sustain some damage. Such indeed is the case here, and a large proportion of malarial infections show a slight amount of albumin with an occasional cast, usually hyalin. It is rather remarkable that under the provocation present an acute nephritis is of such uncommon occurrence. Probably of more consequence than the parasites in the production of inflammatory nephritic changes, is the irritation of the large amount of pigment set free in the blood and excreted, at least to some extent by the kidneys, as shown by its appearance as a sediment and chemically by the increase in iron salts. A well-known law of pathology tells us that slight irritation continued over a considerable length of time will inevitably result in the presence of new-formed connective tissue, which new-formed tissue will in the course of time most surely undergo cicatricial contraction. Many cases of malaria, especially in the more southern latitudes where the estivo-autumnal parasite plays the leading rôle, are the subjects of changes in the kidneys of a chronic inflammatory type, interstitial nephritis, as evidenced by increased secretion of urine, pale color,

low specific gravity, and the presence of a small amount of albumin with granular casts, even when the blood at the time of examination shows the patient to be free from active infection. This change is possibly due to the constant irritation of the pigment, and has been demonstrated in individuals, the victims of paludism, in whom a possible alcoholic etiologic factor can be positively excluded. The subject of malarial hemoglobinuria, while of great practical importance, is of not common occurrence, and is more properly treated under a separate heading.

THE TYPHOID FEVER OF THE ARMY CAMPS.

Sanitary men tell us that with our present knowledge of the causation of typhoid fever every death from that disease is an unnecessary death. This is an excellent principle to hold in view for the guidance of municipal health officers who have some control over the insanitary factors concerned in the spread of the disease and of military medical men serving with well disciplined troops, but we can hardly expect regimental surgeons serving with our volunteer troops at the present time to subscribe to it. Most of our hygienic authorities agree that hastily organized levies have to undergo a typhoid seasoning before they can be considered fit for active service, for every new regiment includes many young men who are susceptible to the disease and their number gives a corresponding susceptibility to the regiment, while the difficulties in the way of controlling the disease are very great. This was our own experience in the Civil War. In the first eighteen months of that war typhoid fever may be said to have been epidemic among the troops that were concentrated around Washington, D. C. In July, 1861, 2.20 cases occurred in every thousand of the 17,709 soldiers camped near the national capital; in August, 6.14 in every thousand of 50,608 men; in September a rate of 5.90 was recorded among 85,408 troops; in October, 7.23 among 113,204, and in November the highest rate of the year was reached, 10.89 cases in every thousand of 133,669 men, or a total of 1456 cases taken sick during that one month. In October and November of the following year, on account of new levies camping on old and infected grounds, the recorded rates rose to 14.49 and 17.84, while the actual rates were really much higher, as most of the cases reported as common continued fever were cases of typhoid infection not included in the statistics of typhoid.

In the JOURNAL of June 4, 1898, we pointed out the danger to our troops from this deadly camp fever as being greater than that from yellow fever, which at the time was exercising a depressing influence on the public mind. We held that unless special care were given to the sanitary condition of our camps, typhoid infection would be introduced and spread with disastrous results similar to those that followed the insanitary conditions of 1861–62. The first circular issued by Surgeon-General STERNBERG on April 25, four days after war was declared, urged on medical and commanding officers the importance of sanitary precautions for the prevention of disease in camps, and its publication was followed by arrangements for the supply of germ-proof filters to troops in the field. These measures, however, were insufficient to counteract the many opposing influences that were brought into operation by the sudden aggregation of large bodies of raw troops and inexperienced officers, medical as well as line. Typhoid fever infection, usually imported from state camping grounds, made its appearance in the large national camps and spread, but much less rapidly than during the concentrations of the civil war. At Camp Alger, Va., at the close of the second month of its recent occupancy, there had occurred in all only thirty-nine cases of fever among the 20,000 or more men on the ground, while at the corresponding period of 1861, the troops near Washington had already sent 8.34 out of every thousand men to hospital with typhoid fever. Toward the middle of July, however, reports from Alger, Chickamauga Park and other camps indicated a rapid increase in the prevalence of the disease, and special inspectors were sent to inquire into the conditions which occasioned the increase. These were found, in general, to be, not impurity of the water supply, but insanitary conditions due to want of knowledge on the part of the volunteer troops of how to take care of themselves in camp. At Camp Alger the water supply from driven wells was organically pure and protected from surface drainage by a thick stratum of impermeable clay; but the tents were crowded against each other and all were overcrowded with men. Regiments were cramped into an area insufficient for battalions, and, as a consequence, there was not room for a sufficiency of sink accommodation on the front or flanks of any of the commands. These sinks necessarily became infected and the disease in some regiments began to assume the proportions of an epidemic. Similar conditions prevailed in Chickamauga Park, Ga., where, in addition, sinks of suitable depth could not be dug owing to the underlying rock being so near the surface. At Tampa, Fla., the height of the subsoil water level necessitated the use of sinks so shallow that when heavy rains fell the infected contents were flushed out of them over the camp surface. These and other insanitary conditions due to continued occupancy led to prompt action by the War Department. Boards of officers were sent to inspect and select new sites for camping grounds and many of the troops are now under orders to march from the old to the new grounds. During a march of ten days or two weeks the cases of fever due to infection in the old camp will be developed and removed to hospital, so that the command on reaching its new site will be free from the disease, and its protection thereafter

will depend on the care given by officers to the sanitation of their camps. The chapter hereafter to be written in the medical history of the Spanish-American War on the development and suppression of the typhoid fever outbreak will be one of much interest to medical men and military sanitarians. It may do much to emphasize the fact that a death from typhoid fever is an unnecessary death. The War Department, meanwhile, has urged upon all officers, from the commanding general to the company commander, the exercise of the utmost vigilance to enforce proper sanitary conditions in camp, that the armies may profit by their recent experiences. We print the sanitary orders of the Department on another page of the JOURNAL.

THE RETURN OF SHAFTER'S ARMY.

Three months ago, that is when the invasion of Cuba was the subject of general interest, few medical men expected that our troops operating in that island would escape visitation from yellow fever. The profession was therefore not surprised when, about the middle of July, the announcement was made of the presence of the disease in the lines around Santiago. Fortunately the capture of the city and the removal of all armed resistance from its front enabled the army to devote the whole of its much exhausted energies to taking care of itself. Two methods of campaign, as it might be called, against this insidious foe were open to the military commanders. One was that of moving from camp to camp on the high grounds back of Santiago and removing the febrile cases and suspects until each regiment was free from the disease, when it could be embarked for Porto Rico or a United States port without danger to itself or to others. Medical men would probably have considered this the better course, but in view of the exhausted condition of the troops a call was made by the military authorities in Cuba for the adoption of the other, the immediate return of the troops to some locality in the United States where the danger of propagating infection would be reduced to a minimum. This involved the danger of a disastrous outbreak on some of the transports while en route, with quarantine detentions at the home port and the possibility of infection finding a landing and transmission to some part of the United States where the conditions were favorable for its development. Prior to this call, however, arrangements had been made by the President and the Secretary of War, after consultation with the Surgeon-General of the Army as to their feasibility, for the return of the troops that are not sick with yellow fever or with suspected yellow fever. Telegraphic instructions approved by the Surgeon-General were sent to Santiago to ensure the best sanitary conditions of the transports and of the troops and their baggage at the time of embarkation. These instructions read as follows:

1. Hold troops assigned to a transport under observation three to five days in separate camp not infected by fever.

2. Surgeons to inspect same twice daily, isolating promptly suspected cases.

3. Bathe and freshly clothe or sterilize old clothing of troops at the beginning of period of observation.

4. When not possible to detain troops in camps under observation, bathe them and freshly clothe or sterilize old clothing before embarkation, excluding, after searching inspection, suspected cases.

5. Yellow fever convalescents or suspects should not accompany healthy troops.

6. No equipage nor personal effects capable of conveying infection should accompany troops unless disinfected by steam or otherwise.

7. Arrange to embark by daylight under a careful supervision of surgeons, who will control sanitary conditions of troop-ships en route.

In the meantime a camp was laid out at Montauk Point, L. I., for the accommodation of the troops, and provision was made for hospitals for the sick and wounded, for hospitals and isolation camps for yellow fever patients and suspects, and for the careful inspection of each transport and the troops brought by her prior to their disembarkation, with thorough disinfection of persons, clothing and other personal effects. Colonel WM. H. FORWOOD, Assistant Surgeon-General, U. S. A., is in charge of the medical department at the new camp. Passed Assistant-Surgeon G. M. MAGRUDER and Sanitary Inspector W. F. BRUNER, formerly inspector for this Government at the Port of Havana, are on quarantine duty as boarding and inspecting officers, and Drs. KINYOUN and HASTINGS have charge of the arrangements for disinfection. In view of these precautionary measures, we may expect to learn of the transfer of the army without mishap to itself or to the country.

CORRESPONDENCE.

The Medical Department of the Army.

CHICAGO, Aug. 9, 1898.

To the Editor:—Apropos of your editorial on the Medical Department of the U. S. Army and Navy, permit me to make a few suggestions.

My experience as Major and Surgeon of the First Ill. Cavalry, U. S. Vol., convinces me that the Medical Department of the Army, as at present constituted, is all wrong. My opinion of the Department as it exists at present is that it is both incompetent and inefficient, and I think this charge will be borne out by others of the volunteer surgeons in the service.

This condition of affairs is not to be wondered at when we take into consideration the various ranks of the medical officers. The Surgeon-General only ranks as Brigadier-General; the Deputy Surgeon-General as Lieutenant Colonel, and so on down the line. It goes without saying that men who are sufficiently endowed by nature with brains and ability to enable them to take an elevated position in this profession can not be induced to enter the army service when the highest position they can attain is that of Brigadier-General. We have seen

the melancholy spectacle of beardless boys among the combatants ranking men who had grown gray in the medical service. The experiences of the present war have proved that the Medical Department is of equal importance to the Field and Staff. We have seen that sickness and disease kill more men than do bullets; hence the demand for medical officers that will be fully equal to any requirements occasion may demand.

How can this be accomplished? It can be done by raising the rank of the Medical Department, so that the Surgeon-General of the Army will be a Major-General; a Deputy Surgeon-General a Brigadier-General, and so on all the way down. If this were done the Army Medical Department would be a desirable service, and would attract men of large ability.

Again, it is my opinion that the Medical Department should be made entirely separate. It should be cut loose from the line, the Quartermaster's and all other departments, and only in the matter of issuing rations should the Commissary be drawn upon. The Medical Department should provide its own transportation in the way of cars, hospital ships, and if necessary, transports. The commanding general should be required to notify the surgeon in charge when a movement was going to be made, what regiments were included, and when an engagement was to take place. Then the medical officers could make full provision for the care of the sick and wounded, and their transportation from the field of battle. Under these conditions there could be no shirking of responsibility, and the shameful sight of an altercation between the Commanding General and the Surgeon-General, such as we are now being treated to over the Santiago campaign, would be an impossibility.

If the Surgeon-General had been instructed to purchase all supplies required for the Medical Department, and if those instructions had been carried out in a competent and efficient manner, there could have been none of the horrors, such as our men had to endure during the present Santiago campaign, which were totally unnecessary and uncalled for. If the regimental and division hospitals at Santiago were no better equipped than those at Chickamauga, I feel sorry for them.

And now for the charges of incompetency and inefficiency. On my arrival at Chickamauga I reported to the Medical Director of the Department and asked for supplies for my hospital. I was asked what I had brought with me, and when I replied, "nothing," I was told that "that's the way with you volunteers, you come down with nothing and expect us to equip you." I said that I certainly expected to be equipped, as the State authorities told us to leave everything and we would be supplied by the U. S. authorities at Chickamauga. To make a long story short, it took me three or four days before I could get a drug supply, and that entirely inadequate.

Upon my arrival in Chickamauga I made requisition on the quartermaster for a hospital tent. It was nearly a week before I got that. Up to the time of my leaving Camp Thomas, every regimental hospital was most poorly supplied with even the necessaries for daily use.

Under these circumstances what would we have done had we been suddenly ordered to the front? It would simply have been a repetition of Santiago.

The excuse for not equipping us properly was that we were to send all our sick to the division hospital. As my regiment was not attached to any division, I was told that I could not be supplied because they did not have the things I asked for supplied from Washington.

There were lots of cots at department headquarters, but it was days before I could get any. There were ambulances down there by the dozens, but up to the time of my departure I could not get a regimental ambulance, when I was entitled to *two*. Every day or so it was impressed on me that I must use the most *extreme economy* in the prescribing of drugs and medical supplies. As if I was going to wantonly waste the property! Instead of being asked by the proper authorities what drugs and supplies I was in need of, and having this proper authority see to it that not only my regiment, but all other regiments were properly and thoroughly equipped with everything necessary to properly care for the sick and wounded, I was compelled to find out for myself to what my regiment was entitled, and then fight for everything I received. To cite an instance, I sent in a requisition and told them it was emergent. As I did not hear anything from it for two days, I went after the things personally, and was told by the Medical Director to go over to the first division hospital for the supplies. Among other things applied for was one gallon of castor oil and a pound of laudanum, with which to treat camp diarrhea, which was prevalent at that time. In response to my requisition the division hospital sent me twelve ounces of castor oil and one ounce of laudanum; the other articles were ignored.

These, Mr. Editor, are some instances of how the Medical Department was administered at Camp G. H. Thomas. If regimental hospitals were well supplied and equipped, then it would have been a very easy matter to have properly organized brigade or division hospitals when the troops were ordered to the front. All the regiments could have transferred their supplies to the general hospitals before an action came on, and have left them there as long as that division remained intact.

On the requisition list of the U. S. Army, which was handed me, there were no such articles as condensed milk, malted milk, nor canned soups of any kind. We were not supplied with sheets, pillows, pillow cases, nor any such articles of absolute necessity for a hospital. If I had not drawn upon my lady friends in Chicago, Springfield and elsewhere, for money to buy ice and milk, and for sheets, pillow slips and night shirts, I would have had a sorry looking hospital. If the Red Cross Society can supply all these things, why can not the Medical Department of the U. S. Army, with a rich, powerful Government behind it, equip its army hospitals beyond reproach? If numbers of medical men whom I could name had been placed at the head of affairs, our whole army would have been completely equipped with every medical and surgical necessity they could require, in *three days*.

I trust, Mr. Editor, that the horrible condition of things which existed at Santiago, as well as the disgraceful sanitary conditions of the various camps, will be investigated, and the whole Army Medical Department reorganized. To refer to requisitions: In one of my applications for supplies I asked for carbolic acid and boric acid. The carbolic acid was struck off my list, as the Medical Purveyor was instructed not to issue it. As I did not receive the boric acid I made inquiries as to why it was not issued, and was told there was none in the camp, as it was not supplied to the army. These are two of the most efficient and cheap antiseptics, which I had to do without. As I had a large number of infected arms, caused by men interfering with their vaccination dressings, it can easily be imagined what a fix I was in. As a result I had a number of axillary abscesses, and some of the men had fearfully swollen arms, which confined them to the hospitals or "quarters."

At Chickamauga there were thousands of men camped for months, during extremely hot weather, yet there were no ice-machines provided to furnish ice for the troops, nor were any provisions made to supply the men with ice, till Dr. Gill of the Red Cross Society made his appearance.

The foregoing are a few of the glaring instances of incompetency and inefficiency which occurred during my stay at the camp.

And now a few words as the water-supply. A number of the wells were drilled throughout the camp to supply water for drinking purposes. A pipe-line was run from the Chickamauga River to supply water for the horses and for washing purposes. The Chickamauga is a dirty, sluggish stream, which drains the greater part of that country. All the ditches

which drained the camp empty into that stream. The men were told not to drink that water, but when a lot of men are tired, hot and thirsty, injunctions of that kind are not heeded, and many of them drank frequently of the water. Not more than two miles farther on, a clear, pure, limpid stream issued from the rock at Crawfish Springs, in volume sufficient to have furnished the camp with water for all purposes. Why was this water-supply not secured instead of the Chickamauga River? The result is that typhoid fever is epidemic at Camp George H. Thomas, and the troops remaining there will, in all probability, have to be removed to other locations.

Trusting you will give this letter publication, in the hope that it may help to correct the glaring defects which exist in the army today, I am, sir, Very truly yours,

WM. CUTHBERTSON,
Late Major and Surgeon First Illinois Vol. Cavalry.

Condition of Santiago.

SANTIAGO, CUBA, July 15, 1898.

To the Editor:—I have just been through the city of Santiago de Cuba. The terms of capitulation will be published before this reaches you. I found the city full of stench and disease; no sanitation. Dead horses, dogs, cats and other animals that starvation had deprived of life are lying bloated and decomposing in the rough, dirty, narrow streets. Thermal fever, dysentery, acute diarrhea and yellow fever are disseminated through the city. The city water supply comes through an eight-inch main which is inadequate for a city of 60,000. The sewerage is almost *nil*. The refuse from the kitchen, such as starvation will give, is strewn into the streets to decompose in the hot sun and daily showers. The streets are full of deep holes, four or five feet wide by one to three feet deep, which speedily become receptacles for the decomposing animal matter and are so many cesspools of nauseating odor. General Shafter has wisely refused to let any of our troops pass into the city. More of Santiago in my next.

There are 26 cases and 3 deaths from yellow fever in the camp near Santiago, 146 cases at Sibone (pronounced Siboney). The number of deaths has not been received today. Of 140 cases of malarial, bilious and thermal fevers in four hospitals, 65 have been discharged for duty. Thirty-two wounded are still in the division hospital. The yellow fever hospital is three-fourths of a mile from the main camp on a hill. The fever hospital and division hospital for wounded are one-quarter of a mile apart.

Sanitation is improving and all doing well. Dr. Pope has worked heroically and deserves the thanks of the American people for his untiring efforts, although often unsuccessful.

Drs. Combs and Jones are in charge of the yellow fever hospital near Santiago; Dr. Wood in charge of the division hospital, and Dr. La Garde of the general hospital at Sibone.

Recapitulation: 1342 wounded in all of the battles since landing in Cuba; 100 deaths so far from wounds, killed and missing; 168 yellow fever cases and 28 deaths from the same cause.

ORLANDO DUCKER, M.D., U. S. V.

Malingering.

UNIONVILLE, N. Y., Aug. 10, 1898.

To the Editor:—I read the JOURNAL with great interest and profit every week. Your editorial on "Malingering" (p. 247, July 30) has just been read with keen interest and suggests that I give you an outline of a case in point.

Mrs. E. V. C., married, one child, aged 35 years, is of an extremely nervous temperament, light weight mentally, but with a glib tongue that elicits the sympathy of similarly constituted persons. Both parents are weak mentally, although father has brilliant spells, but lacks balance and judgment. In January and February, 1894, Mrs. C. had attacks of hysteria and believed she had a cancer of her uterus, which I told her she did not have, but she did not believe it. Every day or two she would have attacks of pelvic pains, a little diarrhea and a slight uterine discharge. During these months she had frequent hysteric convulsions with which she impressed her sympathizers that she had almost died, and it seemed to give her encouragement to have another if she could make her attendants believe she was nearly dead during her spell. She had some time before had an operation for lacerated cervix. Nothing would satisfy her but that nearly every day I must make some kind of an application to the uterus for treatment, and insert a tampon. This I did more to satisfy her than for any good it did. I urged cotton tampons soaked in glycerin and tannic acid and occasionally sprinkled a little powdered opium where it would come in contact with a slightly abraded cervix. I occasionally applied to the inside of cervix tincture of iodin, weak solution carbolic acid, etc. Two or three times I made an application of a weak solution of nitrate of silver (3 gr. to ℥i) in the usual way with the applicator wound with cotton. Using silver nitrate was done more for its mental effect than for any good I hoped to accomplish, for I knew she would try to find out all about nitrate of silver, and finding it to be a strong drug it would satisfy her intense desire that I should use powerful remedies to "kill her cancer." I reckoned wrongly for she soon fell into the hands of a clairvoyant and he told her that she had no cancer, which she promptly believed, but told her that her doctor had "burned her insides all out with nitrate of silver." He easily convinced her that she had no cancer, which I was unable to do, and as easily convinced her that I had ruined her health under the use of nitrate of silver. She soon wanted me to pay her damages for "ruining her health and burning her insides all out."

Physically she is a strong, robust and healthy woman, and is on the go all the time and has been since I quit attending her, Feb. 27, 1894. But most of the time she has been malingering and now and then would work herself up to that pitch where she would either write me a letter or get a lawyer to, demanding damages. These I never paid any attention to except to send them back to her. She has now within the last few days gotten a reputable firm of lawyers to sue me for malpractice. I am interested to know what kind of a case they can work up. It is my candid opinion that she has, with the sympathy of her few mental equals, worked herself up to a belief that I will pay her several hundred dollars rather than have the matter come in the courts.

Are not physicians constantly in danger of expense and trouble from these people, if they treat them, and of annoyance and criticisms if they do not? Truly,

F. W. DENNIS, M.D.

Objects to New Designation.

SHELBYVILLE, IND., Aug 15, 1898.

To the Editor:—I object to the proposed new designation for our profession, suggested by Dr. Fenn in the JOURNAL of August 13. Dr. Sternberg, in his address at Denver, did not recommend the adoption of the title "New School of Scientific Medicine," but merely said, "If we are to be characterized by any distinctive name, this would be the only one applicable."

From the days of Hippocrates to the present, we have always been the scientific school of medicine according to the best light we had. The celebrated Joan Hunter one day said to a member of his class whom he noticed taking notes during one of his masterly lectures on inflammation, "Don't take any notes of what I say today on this subject; I may not think next year as I think today." He was always a member of the "new school of scientific medicine," and kept abreast of the times.

We should always object to the titles "old school" or "allopath," names given to us by the eclectics and homeo-

paths, and simply call ourselves physicians, without any annex or prefix. It almost seemed a necessity for us to semi-officially adopt the word "regular," which, in my opinion, is the only designation we should ever use, and only using this for the information and benefit of the laity. The word "regular" has been the subject of more criticism than any ten sentences in our "Code of Ethics." In the old "Army Regulations," in paragraph 1544, when describing the essential qualifications of one who aspires to an appointment in the medical department of the army, among other requirements is found this very emphatic one, "And he *must* be a graduate of a *regular* medical college."

During the war of the rebellion, a committee was appointed from the eclectic and homeopathic medical schools of New York and Philadelphia to correspond with Surgeon-General Hammond and inquire of him as to the meaning of the word "regular" as used by the Government. His reply was dated from the War Department, Surgeon-General's Office, Washington, D. C., June 1, 1863, and was as follows: "The term 'regular' is used in its most comprehensive sense, as indicating that a college is well-equipped and prepared to cover the *whole* ground of the science and art of medicine and surgery in its teaching."

Then, if we are to be designated by any distinctive name, I think that the only one that is applicable is the word "regular," which has been officially defined by the medical department of the United States, and more than fifty years ago was adopted by our "Code of Ethics," and which always represents progressive scientific medicine throughout the civilized world.

Respectfully,

W. GASTON MCFADDEN, M.D.

Wounds Requiring Operation.

RESERVE AMBULANCE COMPANY, TAMPA, FLA., Aug. 10, 1898.

To the Editor:—In your issue of July 30, I notice that an official report, rendered by me on returning with wounded from the fracas near Santiago, serves as a basis for editorial comment. Permit me to correct the statement there credited to me that "surgical operations were required only in shell wounds," a rather more sweeping assertion than I should care to be responsible for. It is, however, true that shell wounds were invariably serious and almost always accompanied by such extensive laceration and comminution as to render grave operative interference necessary. Mauser wounds, on the contrary, were usually humane and, with the undeformed bullet, were quite free from the so called explosive effect anticipated by the theorists, but they nevertheless occasionally required surgical operations of a more or less serious character. "Keyhole" wounds and those produced by deformed bullets sometimes presented such extensive destruction as to necessitate operation, but the proportion of such operations was surprisingly small. Mauser wounds were "trivial" as compared with those produced by large caliber bullets, on account of the greatly lessened destruction of tissue and the almost total absence of wound infection.

Very respectfully,

EDWARD L. MUNSON, Capt. and Asst. Surg. U. S. A.

Precocious Pregnancy; Twin Births.

MONTEVALLO, ALA., Aug. 6, 1898.

To the Editor:—I wish to mention the case of a negro girl whom I delivered of twins, Feb. 5, 1897. This girl was born and raised in Bolling, Ala. At 11 years of age, she began to menstruate regularly; became a prostitute soon afterward, and was delivered of twins at the age of 13 years, 9 months and 5 days. Both children were females. One is living; the other was accidentally smothered when five days old. The first child presented feet foremost; the second came "head first." The afterbirth was adherent. I administered chloroform and, after introducing the hand, detached it. There was some hemorrhage, but a hot douche controlled it. The mother was exceedingly well developed for her age and made a speedy recovery. I inclose a copy of the birth certificate.

Very truly yours,

D. L. WILKINSON, A.B., M.D.

Antitoxin.

PHILADELPIA, PA., Aug. 8, 1898.

To the Editor:—We beg to inform you that the validity of Letters Patent on Antitoxin recently granted by the U. S. Patent will be duly tested in the proper courts. We write to authorize you to make the public statement that we will protect to the utmost, purchasers and users of Mulford's concentrated antitoxic serum and other antitoxins. We hasten to make this in order that the demand for the remedy, which increases as the season advances, may be supplied without delay or hesitancy.

We have secured the services of W. Horace Hepburn, Esq., and Howson & Howson, competent attorneys of this city, to represent us, and have no doubt but that the claim will be disallowed, in justice to our country in general, and each family in particular.

Thanking you for your interest in the matter, we remain

Yours very truly,

H. K. MULFORD COMPANY,
By H. K. Mulford, Vice-president.

ASSOCIATION NEWS.

Rush Monument Fund.—*To the Editor:*—The following subscriptions to the Rush Monument Fund have been received:

June 21.	Maine Medical Association (through Dr. Chas. D. Smith, Secretary)	$ 100.00
June 29.	Committee of Arrangements, Philadelphia Meeting American Medical Association (through Dr. Thos. G. Ashton, Treasurer)	185.68
July 20.	Subscriptions at Denver Meeting American Medical Association (through Medical Director Albert L. Gihon, Chairman):	
	From Colorado	2,000.00
	From New York	2,000.00
	From Ohio	390.25
	From Indiana	220.00
	From Tennessee	130.00
	From California	110.50
	From Wisconsin	78.00
	From Texas	36.50
	From Med. Director Albert S. Gihon, U. S. N.	25.00
	Total	$5,322.83
	Reported to American Med. Association at Denver.	4,424.27
		$9,747.27
	Total expenditures	112.25
	Total funds in hand.	$9,635.02

The above sum, in cash and secured investments, has this day been transferred to Dr. Henry D. Holton of Brattleboro, Vt., who was elected Treasurer of the Committee by vote of the ASSOCIATION at the Denver meeting. Dr. Holton will be glad to receive and acknowledge further subscriptions to the fund.

GEORGE H. ROHÉ,
Secretary Rush Monument Committee.

BALTIMORE, Aug. 9, 1898.

Rush vs. Hahnemann Monument Fund.—Every visitor to the AMERICAN MEDICAL ASSOCIATION remembers the difficulties encountered by the Rush Monument Fund Committee in its work. The statement has been made at these meetings that the Homeopathic fraternity, with a much smaller membership, had raised a much larger fund, and were having executed a much finer monument to Hahnemann than the one contemplated to Benjamin Rush. Now cometh the statement that the Hahnemann monument is finished, but that it is not in place and will not be until the profession comes forward with the sum necessary to pay for it. What the delinquency amounts to is not stated further than that "three dollars from each

homeopathic physician in America would liquidate all claims and place the monument in Washington."—*Columbus* (Ohio) *Med. Jour.*, August 2.

SOCIETY NEWS.

New York State Medical Association.—The regular annual meeting of the New York State Medical Association will be held at 64 Madison Avenue, New York City, on Oct. 18, 19 and 20, 1898. The following is the preliminary program:

A Practical Demonstration in the Reduction of Infantile Mortality, by Dr. E. F. Brush of Mount Vernon.

The Pneumogastric Nerve in the Production of Stomach Disease, by Dr. Julius Pohlman of Buffalo.

The Coccyx, by Dr. J. E. Walker of Hornellsville.

Drugs versus Cardiac Insufficiency, by Dr. C. T. Osborne of New Haven.

The Passing of Alcohol, by Dr. J. M. Farrington of Binghamton.

A New Method of Amputation at the Knee-Joint Applicable in Cases of Senile Gangrene of the Foot, by Dr. Stephen Smith of New York.

Anthropologic Rambles in the Orient, Especially in the Island of Java, profusely illustrated with stereopticon views, by Dr. H. Ernst Schmidt of White Plains.

Dental Pathology in its Relationship to General Health, by Dr. Dwight L. Hubbard of New York.

Subnormal Temperature, by Dr. Leroy J. Brooks of Norwich.

Ancient and Modern Animal Products Used as Medicines, by Dr. T. J. Acker of Croton on Hudson.

The Treatment of Cases of Pulmonary Tuberculosis that Cannot go Away from Home, by Dr. Delancey Rochester of Buffalo.

Some Observations of General Interest Regarding the Course and Management of Cataract, by Dr. J. H. Woodward of New York.

Technic and Use of Saline Infusion, by Dr. Thomas F. Reilly of New York.

What to Do to be Saved, being the Conclusion of the Inquiry into the Abuse of Medical Charity, by Dr. Thomas J. Hillis of New York.

True and False Medical and Other Charities, by Dr. Wickes Washburn of New York.

A paper by Dr. Charles Phelps of New York, title not yet announced.

Genital Neuralgia and the Genito-reflex Pains, by Dr. F. P. Hammond of New York.

Lantern Slide Exhibition, by Dr. S. Alexander of New York.

A Case of Attempted Obliteration of the Deformity in Pott's Disease, by Dr. Charles Alling Tuttle of New Haven.

Notes on Neuralgic Affections of the Head, by Dr. Gustavus Eliot of New Haven.

The Use of Catgut Sutures in Ventrofixation of the Uterus, by Dr. J. E. Janvrin of New York.

Traumatic Tetanus; Report of a Case Following an Attempted Operation, Treatment, etc., by Dr. Z. G. Lusk of Warsaw.

Some Thoughts on Rational Treatment of Disease, by Dr. Chauncey P. Briggs of Ithaca.

Senility, by Dr. F. W. Higgins of Cortland.

A Case of Extrauterine Pregnancy Operated Upon at Term, by Dr. Eli Van de Warker of Syracuse.

Memoranda, by Dr. H. D. Didama of Syracuse.

Diagnosis and Surgical Treatment of Renal Calculus, by Dr. N. Jacobson of Syracuse.

Eye Lesions in Some Diseases of the Kidney, by Dr. H. S. Oppenheimer of New York.

Insanity Following Surgical Operations, by Dr. W. D. Granger of Bronxville.

Dermoid Cysts of the Ovary, by Dr. C. E. Fritts of Hudson.

The Operative Cure of Inguinal Hernia in Men, by Dr. E. D. Ferguson of Troy.

Urethral Stricture, by Dr. J. W. S. Gouley of New York.

A Discussion on Intestinal Obstruction, comprising the following papers:

Introduction, by Dr. Parker Syms of New York.

The Causes of Acute Intestinal Obstruction, with a Description of Their Mechanism, by Dr. E. D. Ferguson.

The Causes of Chronic Intestinal Obstruction, with a Description of Their Mechanism, by Dr. J. D. Bryant of New York.

Intestinal Obstruction Due to Impaction of Feces, Gall Stones, Foreign Bodies, etc., by Dr. J. W. S. Gouley.

The Diagnosis and Indications for Treatment of Acute Intestinal Obstruction, by Dr. J. D. Rushmore of Brooklyn.

The Diagnosis and Indications for Treatment of Chronic Intestinal Obstruction, by Dr. Leroy J. Brooks.

Intestinal Obstruction Due to Intussusception and Volvulus, by Dr. John F. Erdmann of New York.

The Technique of Operative Treatment of Intestinal Obstruction, by Dr. Frederick Holme Wiggin of New York.

PUBLIC HEALTH.

Transmission of Typhoid Fever Through the Air.—Germano has published the results of experiments made at the suggestion and under the direction of M. Kruse, and having for their object to study the possibility of the transmission of typhoid fever through the air. These experiments, made with different specimens of earth and substances infected by Eberth's bacillus, demonstrate that these organisms do not long resist complete dessication. For this reason the author claims that the spread of typhoid fever by means of dry dust is impossible, and that the assertion of certain authors, Troidboise among others, that the infection may spread several meters through the air is scarcely probable. On the other hand, the experiments of Germano, as well as of other writers, appear to prove that, in certain conditions of humidity, the pathogenic agent of typhoid fever not only remains alive for a rather long period, but may even preserve its vitality when in a condition of apparent dessication. Conditions favorable to transmission are produced, above all, when typhoid bacilli adhere to subjects which easily retain moisture, such as linen, cloth, earth, dust and fecal matter. Even in these circumstances, however, the microbes generally perish after dessication although some of the most resistant survive. The danger consists not so much in particles of these substances being carried through the air, since, when the mechanical fragmentation is carried to an extreme degree, the microbes perish, as in the fact that such particles may gain access to the mouth of susceptible subjects. The essential danger of propagation of the typhoid bacillus lies in the power of the organism to live for a long time when dessication is incomplete. This property may explain the spread of many epidemics.—*Health.*

Aerial Convection of Smallpox.—That a smallpox hospital in a poor and crowded locality may be, and usually is, a source of infection to the surrounding neighborhood is not denied; it is when we come to inquire for the causes of the spread in its vicinity that doubt and difficulty arise, and it is impossible to agree with Dr. Priestly that so long as a smallpox hospital is allowed to be a source of danger, whether it be by aërial infection or by maladministration, it does not concern a medical officer of health as a matter of fact, for the question is not merely of academic interest, seeing that its solution must be of some importance, not as an argument for or against placing smallpox hospitals in crowded localities, but in view of the selection of a site within a mile of any human dwelling. In every smallpox epidemic it is found that a certain percentage of cases around a hospital can be traced, apart from any question of maladministration, to ordinary known channels of infection, such as the incomings and outgoings of nurses, staff, tradesmen, patients, and friends of patients, and these are and must invariably be intensified as we approach such a center as a smallpox hospital; but even after the most searching inquiry a residuum remains to which no clue has been discovered, and of these it is said that they diminish in number as we get farther from the hospital, which is not invariably the case, and that they are not in excess along the main approaches, which we should have no right to expect, for the people who walk in a street are not always those who dwell in it. The elimination of this residuum is always a matter of extreme difficulty, as has been shown even when the investigation has taken place dur-

ing the progress of an epidemic, much more after a lapse of weeks or months, yet it is upon the complete elimination of these cases that the theory of distal aërial infection is based. That the theory has never been disproved is no argument in its favor, for the same might be said of the wonders worked by the diviner's rod. The main question is whether the theory fits in with the facts; if it does not, then it has not come to stay, but must make way for some other that will. Observations are wanted, especially in the country, where facts can be ascertained with much more precision than in a populous center. There must be many available from medical officers of health and medical practitioners throughout the country if only they could be collected. The chief difficulty, however, in accepting the distal infection theory remains to be noticed, viz., the startling immunity which has over and over again been observed in large bodies of presumably susceptible individuals living near to smallpox hospitals and among whom, according to the distal aërial theory, smallpox should have appeared with an intensity proportioned to their nearness to the center of infection. No explanation is offered for these remarkable exemptions from the incidence of a disease which (within limits still undefined) is acknowledged to be infectious above all others, and when it is borne in mind that by the chance discovery of its origin in a single case a clue might be given which would sweep away the better part or even the whole of the residuum on which the "circle argument" is based, the conclusion is irresistible that the theory of distal aërial infection rests on a very imperfect basis and that much more evidence is required before it can meet with general acceptance.—London *Lancet*.

Vital Statistics for June, 1898, in the State of New York.—June is always, next to November, the month of least mortality in this State; with an average daily mortality of 320 for the entire year, for the past ten years, that of June has been 294. The daily average for the past month reported has been 288, that of the five months preceding having been 325. Compared with the preceding month of May there were 1100 fewer deaths reported, of which decrease 300 occurred in the maritime district; the death-rate has lessened from 17.15 per 1000 population to 16.00. Aside from diarrheal diseases there were 100 fewer deaths from zymotic diseases this month. Diarrheal diseases caused 250 more deaths than in May. From acute respiratory diseases there were hardly more than half as many deaths, there having been about 700 fewer than in May, and there were 120 fewer deaths from consumption. Diseases of the digestive organs caused more deaths than in May, but other local diseases show a considerable decrease. Accidental deaths, many of which were from drowning, caused an increase of 100 over May. Fewer deaths from old age occurred this month. Compared with June, 1897, there were fewer deaths in all of the sanitary districts, the maritime district reporting 150 fewer, and in the entire State the reported mortality is less by 400, and by nearly as many is it less than the average of June for the past ten years. A large part of this decrease is in the mortality of early life, and one-half of it is in zymotic diseases. There is also a considerable decrease in acute respiratory diseases. Diarrheal diseases caused 375 deaths, half the usual mortality for June. Diphtheria caused 175 deaths, or 50 less than in May, and one-half that of June, 1897. Whooping-cough caused 111 deaths, the same number as in May and double that of last June. Cerebrospinal meningitis is also very much more prevalent than a year ago, 110 deaths being reported from it, which is excessive, all the sanitary districts reporting it, but the increase is mainly in the maritime district. Consumption shows the usual June mortality, about 1000 deaths. Smallpox has developed in no new localities since the report of last month. All of the ten reported localities, except Fredonia and Moravia, are believed to be free from the disease and these are probably soon to be relieved. Of the 50 cases in all, 8 occurred in the troupe importing it; the cases have been generally very mild, no fatality occurring. The mean temperature for the month was 1 degree above the normal of 66 degrees, the average highest being 90 degrees, lowest 43 degrees; there were ten clear days and a slight deficiency for the State in rain-fall, although this was excessive in the eastern part of the State; winds southwesterly.—*Bulletin of the State Board of Health*, New York.

Health in Chicago.—The report of the Department of Health for July gives the total deaths for the month as 1938, a rate of 1.20 per 1000 as compared with 1.44 for July, 1897, and 1.52 for July, 1896. Of these deaths, 614 were of persons under one year of age, and 241 between one and five years. The principal causes were: Diseases of the nervous system, 246; diarrheal diseases, 247; other acute intestinal diseases, 208; consumption, 163; heart diseases, 119; pneumonia, 77; typhoid fever, 55; diphtheria and membranous croup, 48; cancer, 48; bronchitis, 34.

Circular No. 5.—

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
WASHINGTON, Aug. 8, 1898.

The attention of medical officers is invited to Circular No. 1 from this office dated Washington, April 25, 1898.

The extensive prevalence of typhoid fever in camps of instruction indicates that the sanitary recommendations made in this circular have not been carried out. If medical officers have failed to make the proper recommendations as indicated, the responsibility rests with them. If the recommendations have been made and not acted upon by those having authority in the various camps, the responsibility is not with the Medical Department, but these recommendations should be repeated and commanding officers urged to move their camps at frequent intervals and to maintain a strict sanitary police.

GEO. M. STERNBERG, Surgeon-General, U. S. Army.

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
WASHINGTON, April 25, 1898.

Circular No. 1.

In time of war a great responsibility rests upon medical officers of the Army, for the result of a campaign may depend upon the sanitary measures adopted or neglected by commanding generals of armies in the field. The medical officer is responsible for proper recommendations relating to the protection of the health of troops in camp or in garrison, and it is believed that, as a rule, medical officers of the United States Army are well informed as to the necessary measures of prophylaxis and the serious results which infallibly follow a neglect of these measures, especially when unacclimated troops are called upon for service in a tropical or semitropical country during the sickly season. In Cuba our armies will have to contend not only with malarial fevers and the usual camp diseases—typhoid fever, diarrhea, and dysentery—but they will be more or less exposed in localities where yellow fever is endemic, and under conditions extremely favorable for the development of an epidemic among unacclimated troops. In view of this danger, the attention of medical officers, and of all others responsible for the health of our troops in the field, is invited to the following recommendations:

When practicable, camps should be established on high and well-drained ground not previously occupied.

Sinks should be dug before a camp is occupied, or as soon after as practicable. The surface of fecal matter should be covered with fresh earth or quicklime or ashes three times a day.

New sinks should be dug and old ones filled when contents of old ones are two feet from surface of ground.

Every man should be punished who fails to make use of the sinks.

All kitchen refuse should be promptly buried and perfect sanitary police maintained.

Troops should drink only boiled or filtered water and coffee or tea (hot or cold), except where spring water can be obtained which is pronounced to be wholesome by a medical officer.

Every case of fever should receive prompt attention. If albumin is found in the urine of a patient with fever it should be considered suspicious (of yellow fever) and he should be placed in an isolated tent. The discharges of patients with fever should always be disinfected at once with a solution of carbolic acid (5 per cent.) or of chloride of lime (6 oz. to a gal-

ion of water), or with milk of lime, made from fresh quicklime.

Whenever a case of yellow fever occurs in camp the troops should be promptly moved to a fresh camping ground, located a mile or more from infected camp.

No doubt typhoid fever, camp diarrhea, and probably yellow fever are frequently communicated to soldiers in camp through the agency of flies, which swarm about fecal matter and filth of all kinds deposited upon the ground or in shallow pits, and directly convey infectious material, attached to their feet or contained in their excreta, to the food which is exposed while being prepared at the company kitchens, or while being served in the mess tent. It is for this reason that a strict sanitary police is so important. Also because the water supply may be contaminated in the same way, or by surface drainage.

If it can be avoided, marches should not be made in the hottest part of the day—from 10 A.M. to 5 P.M.

When called upon for duty at night or early in the morning, a cup of hot coffee should be taken.

It is unsafe to eat heartily or drink freely when greatly fatigued or overheated.

Ripe fruit may be eaten in moderation, but green or overripe fruit will give rise to bowel complaints. Food should be thoroughly cooked and free from fermentation or putrefactive changes.

In decidedly malarious localties, from 3 to 5 grains of quinin may be taken in the early morning, as a prophylactic, but the taking of quinin as a routine practice should only be recommended under exceptional circumstances.

Light woolen underclothing should be worn, and when a soldier's clothing or bedding becomes damp from exposure to rain or heavy dews the first opportunity should be taken to dry it in the sun or by fires.

GEO. M. STERNBERG,
Surgeon-General U. S. Army.

[NOTE.—Circular No. 3 is the last of the series of 1897.]

NECROLOGY.

JOHN B. HATTON, M.D., Des Moines, Iowa, died August 7. Dr. Hatton was born in an Indian camp in Monroe county, Mo., July 7, 1839, the last of thirteen children. When 17 years of age he entered a subscription school, paying his tuition with money earned from working on a farm. Later he began the study of medicine under the instruction of his brother. Afterward, in the winter of 1859-60 he secured the advantages of a lecture course in the College of Physicians and Surgeons at Keokuk, Iowa. While thus preparing himself the Civil War occurred and he enlisted in Company F, Thirty-fourth Iowa volunteers, and was elected first lieutenant of the company. Oct. 15, 1862, he was mustered into the service and commissioned as first lieutenant. The regiment took a prominent part in the three days' fight at Chickasaw Bluffs, Miss., under Sherman, later in the great battles about Vicksburg, and was present at the surrender of Pemberton and his army, July 4, 1863. Afterward the regiment participated in the battles which ended in the capture of Forts Gaines and Fisher. Dr. Hatton was made assistant-surgeon, and when the captain of his company, being wounded and unable to retain command, resigned, he was appointed to the place in November, 1864. He located in Des Moines in 1890.

RICHARD M. SWEARINGEN, M.D., New Orleans School of Medicine 1867, and Louisville Medical College 1886, died at his home in Austin, Texas, August 7, in his 60th year. He was State Health Officer of Texas for twelve years. For his efficient service during the yellow fever outbreak on the Gulf coast in 1897, he will be long remembered, notwithstanding his unmerited unpopularity with the business community.

JOHN H. PICKETT, M.D., Buffalo, N. Y., 1865, died August 9, in Elizabeth, N. J., of which city in 1884 he was a defeated candidate for the mayoralty. He was a war veteran, prominent in temperance circles and until his health failed was a surgeon of the N. J. Central Railroad. His wife died several years ago, and so far as known he has no living relatives.

CARL E. ELSNER, M.D., Halle, 1874, died at his home in New York City, August 8, after a lingering illness. He was a surgeon in the German army and received the Iron Cross for skill and bravery during a campaign. A resident of this country for the past twenty years, he achieved more than an average success.

THOMAS J. DOUGHTY, M.D., University of Michigan 1896, Health Officer of Fishkill and Matteawan, N. Y., died at the home of his father, Dr. John H. Doughty, August 2. He was aged about 31 years.

WARREN KEMBLE, M.D., College of Physicians and Surgeons, N. Y., 1868, of Saugerties, N. Y., died there August 10, aged 57 years.

E. GERTRUDE CRUM, M.D., Assistant Physician of the Binghamton (N. Y.) State Hospital for the Insane, died August 5, aged 31 years.

JOHN H. BAILEY, M.D., Sturgis, Ky., July 30, aged 28 years. ——Frank Hamer Brickell, M.D., New Orleans, La., August 8, aged 41 years.——William McGregor, M.D., of the McGregor Hospital, Sioux City, Iowa, August 5.——J. D. Martin, M.D., Savannah, Ga., August 3, aged 40 years.——E. G. Moore, M.D., Spring Valley, Ill., August 11.——Ambrose Morrison, M.D., Nashville, Tenn., August 3.

BOOK NOTICES.

Wounds in War. The Mechanism of their Production and their Treatment. By Surgeon-Colonel W. E. STEVENSON, Professor of Military Surgery, Army Medical School, Netley, England. Pp. 588. 8vo, profusely illustrated. New York: William Wood & Company. Muslin, $4.00 net.

The author says truly in his preface "that no branch of surgery has undergone more important changes in consequence of the teachings of Lister and Pasteur than that of gunshot wounds."

There are fourteen chapters, divided as follows: 1. Introductory remarks on wounds by side arms, rifles, portable firearms and the mechanics of projectiles. 2. Characteristics of injuries produced by projectiles, 3. The primary phenomena and symptoms accompanying gunshot wounds (such as shock and hemorrhage). 4. Treatment of wounds in war. 5. General treatment of the bullet wounds. 6. Gunshot wounds of joints. 7. Gunshot wounds of hip-joints. 8. Gunshot wounds of the diaphyses of long bones. 9. Wounds of the head. 10. Wounds and injuries of the chest. 11. Wounds and injuries of the abdomen. 12. Injuries of the pelvis. 13. Defects and use of modern small arms in the wars of the future. 14. The Geneva Convention.

The illustrations in the volume comprise a good many photographs showing the effect of gunshots. The recognition of American authors is full and complete, the lamented Otis being frequently quoted and at length. Senn, Nancrede, McGraw, Marion-Simms and the late Charles T. Parkes are mentioned frequently. In regard to Otis the writer says: "I have frequently availed myself of that inexhaustible source of information on this subject, 'The Surgical History of the War of the Rebellion' in the United States, by G. A. Otis, a work which must continue to be a record of labor and research which may never be surpassed." Notwithstanding the generous praise given by the author to his predecessors, he has ample reason for having opinions of his own on most subjects and indeed does not hesitate to modestly express them.

The author points out the infrequency of amputations in these latter days, but our military brethren will see nothing about the effects of the Mauser bullet, although there is an abundance of material on others of the same class.

The work is of great value, not only to military but to civil surgeons as well.

Manual of the Diseases of Children. By JOHN MADISON TAYLOR, M.D., and WILLIAM H. WELLS, M.D. Illustrated. Pp. 473. Philadelphia: P. Blakiston's Sons & Company, 1898. Price $4.00 net.

This is not claimed to be an exhaustive treatise on the dis-

eases of children, although if it had been so claimed, the claim would not have been far out of the way, as it seems to contain all the essentials, and the aim of the authors has been to present in a clear and precise manner the chief points. Pathology has been abbreviated, not because this most important division of the subject is not valuable, but for the reason that in so small a work there is not surface room to adequately describe the constantly increasing discoveries in this direction.

There are twenty chapters which cover in a general way the physiology of the infant in childhood; diseases occurring at or near birth; general hygiene of infants and children; feeding and food; the breeds of cows best adapted for infancy feeding; diet of children; artificial foods, recipes, etc.; diseases of the peritoneum; diseases of the liver, diseases of the genito urinary system; diseases of the genital organs; diseases of the blood; diseases of heart, respiratory organs; nervous system; diseases of the acute infections; diseases of the skin; physical development; diseases and accidents requiring surgical procedures. The book is well written and up to date.

International Clinics. A Quarterly of Clinical Lectures. By JUDSON DALAND, M.D.; J. MITCHEL BRUCE, M.D.; DAVID W. FINLEY, M.D. Volume ii, 8th series. Pp. 363. Philadelphia: J. B. Lippincott Company. 1898.

These clinics are very useful and the present volume contains clinical lectures on subjects of current interest to the profession. The contributors to the volume are A. H. Freeland Barbour, M.D.; A. L. Benedict, M.D.; S. S. Bishop, M.D., B.S., LL.D.; William C. Boteler, M.D.; James Cantlie, M.B., F.R.C.S.; J. H. Claiborne, M,D.; Henry Clark Coe, M.D.; E. Treacher Collins, F.R.C.S.; Floyd M. Crandall, M.D.; Charles Green Cumston, M.D.; James Mackenzie Davidson, M.D.; Prof. C. A. Ewald; L. Webster Fox, A.M., M.D.; Louis Frank, M.D.; J. McFadden Gaston, M.D.; A. Pearce Gould, M.S., F.R.C.S.; Professor Grancher; J. N. Hall, M.D.; B. C. Mirst, M.D.; W. W. Keen, M.D.; John A. Larrabee, M.D.; Alexander McPhedran, M.D.; W. Milligan, M.D.: F. W. Mott, M.D.; T. Pickering Pike, F.R.C.S.; A. Pinard, M.D.; Prof. Albert Robin; A. D. Rockwell, M.D.; William L. Rodman, M.D.; J. T. Schamberg, M.D.; N. Senn, M.D.; John Lindsay Stevens, M.D.; Prof. R. Von Jaksch; W. Hale White, M.D.; Frank C. Wilson, M.D.; James K. Young, M.D.

It will be seen by the list of names and the special articles by each, that medicine, neurology, surgery, gynecology, obstetrics, ophthalmology, laryngology, pharyngology, rhinology, otology and dermatology have able representatives. As clinicians the ability of these teachers is well known, and the fortunate possessor of this book, if he draw on his imagination very little, can easily imagine himself once more in the amphi theater reviewing the scenes but not the teachings of his youth. The popularity of these volumes has been immense and it is not likely that there will be any falling off in the interest which attaches to them.

The Office Treatment of Hemorrhoids, Fistula, etc., without operation, together with remarks on the relation of diseases of the rectum to other diseases in both sexes, but especially in women, and the abuse of the operation of colostomy. By CHARLES B. KELSEY, A.M., M.D. 12mo, cl. 68 pages. Price 75 cents, net. New York. E. R. Pelton, 1898.

The contents of this volume are: The Cure of Hemorrhoids, Fistula, Fissure and other Affections of the Rectum by Office Treatment without Operation. On the Relation between Diseases of the Rectum and other Diseases in both Sexes, but especially in Women. On the Abuse of the Operation of Colostomy, or the Formation of an Artificial Anus.

Anything written by Doctor Kelsey on subjects with which he has been so many years identified will always receive attention. Doctor Kelsey has proved that a great many cases of hemorrhoids and fistula can be treated without surgical operation and this little book contains three lectures that set forth his methods. The charlatan has too frequently had a monopoly of operations "without the knife or ligature," and the author has done well in giving the legitimate profession the means of accommodating those of their clients whose fear of operative measures is likely to lead them astray.

Electricity in the Diagnosis and Treatment of Diseases of the Nose, Throat and Ear. With 16 illustrations. By W. SCHEPPEGRELL, A.M., M.D. Pp. 403. New York and London: G. P. Putnam, Sons, 1898 [from A. C. McClurg & Company, Chicago]. Price $4.50.

The illustrations in this book are fair, and the printing is well done. The book is printed on good paper.

The use and application of electricity has been retarded largely by reason of the extravagant claims made for it at the outset. These have now become circumscribed and the exact field of electro-therapeutics more clearly defined. In effect, while the claims have become more trustworthy, the use of electricity in medicine has become greatly extended and it is believed now by many, that, so far as electro-therapeutics is concerned, notwithstanding its occasional brilliant results, it is now only on the threshold of what it will become in the future.

Exercises in Practical Physiology. By AUGUSTUS D. WALLER, M.D., F.R.S. Part 3. Physiology of the Nervous System; Electro-Physiology. Pp. 80, 91, bds. London: Longmans, Green & Company. 1897.

We have already noticed the first and second parts of this physiology, and this volume is a continuation of the series and gives full directions for the carrying out of experiments in the physiologic laboratory on the physiology of the nervous system. There are sixty-eight demonstrations in this work.

Atlas and Epitome of Operative Surgery. By Dr. OTTO ZUCKERKANDL. Authorized translation from the German. Edited by J. CHALMERS DACOSTA, M.D. With 24 colored plates and 217 illustrations in the text. Pp. 395. Philadelphia: W. B. Saunders. 1898. Price $3.00 net.

This Atlas is a valuable one. The selections are judicious. This book is a very fitting companion piece to the surgery of the translator, which was issued about the same time and which is elsewhere noticed.

Tropical Diseases, A Manual of the Diseases of Warm Climates. By PATRICK MANSON, M.D., LL.D. (Aberd.), London. Pp. 625. 12mo. Illustrated by 88 wood engravings and two colored plates. New York: William Wood & Company. Muslin, $3.50 net.

Dr. Patrick Manson, the author of this book, has had a special opportunity for observation of the tropical diseases, especially in China, where his various papers have been published from time to time in the medical reports of the *Imperial Chinese Customs Gazette* and have been of great value and peculiar interest. To Manson is due, more than to any other, the establishment of the fact that the mosquito is the intermediate host of the *filaria nocturna*. Few have had better opportunities for observation of the filarious diseases than Dr. Manson, and he has made very good use of them.

A careful review is given, in the book, of the unclassified fevers of the tropics. Beriberi, leprosy and yaws receive full attention.

Just now, when the eyes of many medical men are turned toward the tropics, this volume will prove very interesting and instructive.

A Practical Treatise on the Diseases of Women and Their Treatment by Electricity. Third edition, revised, rewritten and greatly enlarged. By G. BETTON MASSEY, M.D. Illustrated with twelve full-page original chromo-lithographic plates in colors, numerous full-page original plates of photographs taken from nature, and many other engravings in the text. Royal octavo, 400 pages. Extra cloth, beveled edges, $3.50 net. New York, Philadelphia and Chicago: The F. A. Davis Company. 1898.

The work of Dr. Massey as completed gives a fair résumé of the teachings of the day in regard to the use of electricity in gynecology. It will be especially welcomed by those who limit

the field of operative surgery in gynecologic cases, in some of which electricity sometimes exerts a wonderful influence. Heretofore the electricians have seemed to claim too much for their favorite agent. That it has a distinctly enlarging scope there is no doubt. The work under consideration is conservative and well written.

A Primer of Psychology and Mental Diseases for the Use of Training Schools for Attendants and Nurses and in Medical Classes. By C. B. BURR, M.D. Second edition, thoroughly revised. Pp. 116. Philadelphia, New York and Chicago: The F. A. Davis Company, 1898.

This book is a general guide to the management of cases of insanity, and contains also a valedictory address delivered to the class of 1895, Training School for Attendants of the Eastern Michigan Asylum. It is well adapted for the use of junior medical students as well. In the management of cases the author's advice is sound and judicious. Many of the precepts laid down by him are worthy to be engraved over the doors of the wards of asylums so that they might be ever present to the attendant.

A Manual of Surgery for Students and Practitioners. By WILLIAM ROSE, M.B., B.S. Lond., F.R.C.S., and ALBERT CARLESS, M.S. Lond., F.R.C.S. Pp. 1162. 8vo. Profusely illustrated by wood engravings. New York: William Wood & Co., Publishers. Extra muslin $5.00 net, leather $5.75 net.

This work is intended to be a complete treatise on surgery, in a single volume, and its principal author is well known in this country as a distinguished operator. We have examined this book with much pleasure and take pleasure in commending it. We recognize a number of old-timers among the illustrations, but for the most part they are new. We commend the work and predict for it considerable popularity in this country.

Manual of Physical Diagnosis, for the use of students and physicians, by JAMES TYSON, M.D. Third edition, revised and enlarged. Colored and other illustrations. Pp. 179. Philadelphia: P. Blakiston's Son & Company, 1898. Price $1.50 net.

This manual has not been changed especially from the last edition except in the sections on examination of the blood and the chemic examination of gastric contents. A number of new illustrations have been introduced together with other additions of a minor character, all adding to the accuracy and usefulness of the book.

Prof. Tyson is too well known as a careful observer and skillful clinician for us to do more than mention his name in connection with a work, to give it sufficient praise.

Ovariotomy and Abdominal Surgery. By HARRISON CRIPPS, London; J. & A. Churchill, 1898. [Philadelphia: P. Blakiston's Son & Company. Price $8.00 net.]

The author says, "the chief object of this work is to record only such operative details as I have found valuable in my experience, that without the book running into a larger scope than was intended, it is impossible to describe in detail the various methods adopted by other operators." Cripps has been known in this country many years, by reason of his bold and original methods of operating. Cases are given in the latter end of the book, and the operator who follows Cripps' methods will make few mistakes.

Manual of Modern Surgery. General and Operative. By JOHN CHALMERS DACOSTA, M.D. With 390 illustrations. Pp. 911. Philadelphia: W. B. Saunders. 1898 [From W. T. Keener, Chicago Agent].

This is a much better book than its predecessors. It will be found concise and entertaining, as the book is not padded, but contains the essentials of the practice of surgery. The methods recommended are up-to-date.

Accessory Nipples.—Accessory nipples were noted in 10,000 out of 115,000 recruits examined recently in Germany, according to a communication in the *Progrès Médical* of June 25.

MISCELLANY.

Inherited Tabes.—Kalischer reports simultaneous cases of tabes dorsalis in mother and son of 21 years, without a trace of syphilitic antecedents in either.—*Berlin Klin. Woch.*, No. 18.

Cholera in India.—Between Monday morning and Friday night, says a dispatch from Madras, August 13, there were fifty five deaths from the disease, the fatalities prior to the day first mentioned having been 117.

The School of Medicine of Georgetown University, Washington, D. C., is now a full-fledged day-school, the last evening classes being held last year. On August 15 the new hospital, under the control of the school and having accommodations for thirty patients, was opened, in connection with which there is an emergency and dispensary service.

Modern Bullet Wounds.—"The destructive character of the bullets when they strike a hard surface, was shown in the wounds treated during the recent riots in Milan," states the *Klin. Therap. Wochenschrift* of June 26. "Every arm or limb wounded had to be amputated; every person shot in the trunk died, and whenever the skull was struck, the top was lifted up like the cover of a box and the brain matter scattered around."

Creation of an Articulation.—Ollier reports unexpectedly successful functional results in a case in which the upper end of the humerus and scapula had already been removed. He created an articulation by fastening the clavicle to the floating upper end of the humeral diaphysis, modifying with a few stitches the points of insertion of the deltoid and scapula muscles to adapt them to the new articulation, which works remarkably well.—*Echo Méd. du Nord*, June 19.

An International Lepra Archiv.—A lepra archiv is to be established by a committee including E. Besnier, K. Dehio, A. Hansen, J. Hutchinson and A. Neisser. It is intended to contain all administrative and legislative measures in regard to leprosy as well as scientific communications in the three principal languages. The sympathy and coöperation of all interested in the subject are most cordially requested.

Traveling Professorships.—An anonymous benefactor has presented the Paris University with funds sufficient to endow for a term of years five of the professors "agrégés of secondary instruction" with 15,000 francs each for a trip around the world, a knowledge of English the only condition. Another endowment provides an income of 2,000 francs to be loaned to needy French or foreign students, the amount to be returned later without interest.

Cerebral Neoplasms.—Krauss in the *New York Medical Journal* for July 30, considers the classic symptoms of brain tumor in their order of importance as: 1, head pain; 2, optic neuritis; 3, mental apathy; 4, nausea and vomiting, and 5, paralysis as a special localizing symptom. The early symptoms are headache, incapacity for mental work, disordered digestion, nervous irritability, and a general malaise. Choked disc or optic neuritis he considers almost pathognomonic of cerebral tumor and a decisive symptom.

Alcohol Injections in Cancer.—In the *Philadelphia Medical Journal* of May 28, Kuh makes a second contribution to this treatment. He reports cases and discusses the work of Hasse of Germany, in curing fifteen out of eighteen well authenticated breast cancers. He believes one may safely begin with 30 per cent. injections, increasing to 40 or 50 per cent., as the tolerance of the patient permits. He says that in cases in which the growth has become adherent to the pectoral muscle, Hasse always advised the operation, followed by alcohol injections, and again, all relapses should be treated or prevented by the injection method, as the pitiful insufficiency of surgery in relapses is too well known to be dwelt upon.

"Journal of Tropical Medicine."—It is proposed, if enough support can be obtained for the scheme, to publish in London a monthly journal dealing with the diseases of warm climates, to be devoted to the publication of papers on tropic diseases and to the discussion of subjects scientific and practical affecting the interests of medical men in tropic and subtropic climates. The annual subscription, including postage, is to be 17s. We wish the promoters success in their new venture. They deserve it, for there is no country which has such a large interest in the tropics and the diseases common to them as our own.

Longevity and Wine.—According to *La Médicine Moderne*, red wines are preferable to white because the consumers of the former live longest. A viticulturist of the Gironde bethought himself to carry out an investigation as to human longevity in white and red wine districts respectively, taking as his basis the electoral lists in the various departments. Among 7738 electors domiciled in a red wine country he found 381 individuals who were more than 75 years old, whereas among 3029 electors belonging to a white wine country there were only eighty-one, an appreciable difference. Yet red wine is more easily adulterated than white wine.—London *Lancet*, July 16.

Recovery from Traumatic Tetanus.—Davis (*Annals of Surgery* for August) reports two cases of recovery from traumatic tetanus after the use of antitoxin. The first case received forty-two doses in eighteen days, the second twenty-eight in twelve days. Sedative drugs were used in addition to the antitoxin, but he believes that this does not destroy the value of the evidence for antitoxin. In the first case symptoms arose one week after its reception and during the next week had not progressed further than having pain in the cheek, throat, back and neck, with contraction of the facial muscles, difficulty in swallowing, inability to fully open the mouth and a slightly staggering gait. The second case on entering the hospital was having three to eight spasms hourly, the injury having been received three weeks previous to admission; and his symptoms had been present for a week.

Epilepsy.—According to the latest views, epilepsy is a complex of symptoms proceeding from a diseased condition of the cortex, induced by three factors; hereditary and personal tendency and a periodically-recurring, exciting cause, evidently toxic substances periodically accumulating in the organism from abnormal metabolic processes. The nature of these toxic substances is still undetermined; in certain cases it seems to be the ammonium carbaminate derived from the urea. These views indicate the importance of dietetic and therapeutic measures to control the metabolism and promote the elimination of the toxic substances, while they still maintain the value of the bromids and quieting remedies. They also point out the lines for further research.—*Munich Med. Woch.*, June 28.

Endarteritis of the Renal Arteries.—Drs. Bradford and Lawrence have made a joint research on this subject and report an illustrative case in a hospital patient, a female, aged 36 years, suffering from anuria: history mainly negative; anemia and weakness, but no dropsy, headache, sickness or convulsions; intellect clear to the last. The cortex of each kidney was found bright buff-colored, and sharply defined from the pyramids; microscopically the convoluted tubules were seen to be necrotic. This necrosis was due to thrombosis of all those branches of the renal artery which had reached an approximate diameter of 100 μ evidently of the so-called "interlobular" arteries; all branches of the renal arteries were extensively diseased, the media and especially the intima being thickened and sclerosed. The interstitial tissue of the kidneys was not increased. The patient thus presented the typic clinical picture associated with "obstructive suppression," while the morbid appearances were such as should, according to theory, have given rise to uremia. The authors hold that this case throws grave doubts on the view held by many, "that uremia is independent of the mere retention of normal but toxic products that ought to be excreted." The case also shows the independence of renal endarteritis and extensive renal cirrhosis.—*British Medical Journal.*

Gunshot Injuries of the Spine.—Prewitt (*Annals of Surgery* for August) divides gunshot injuries of the spine into three classes: 1. Those that simply fracture the arches. 2. Those that invade the canal, crushing the cord and damaging the vertebræ. 3. Those complicated by serious injury to abdominal or thoracic viscera. As to the first class, he advises immediate treatment by laying open the track of the wound under most rigid antisepsis, as do most surgeons. Although most of the second class cases are fatal sooner or later, he believes that the dangers of myelitis and meningitis, with a prolongation of the lives of some, even though paraplegic, will follow the cleaning and disinfecting of the wound. Of the third class he says: "The presence of complications due to the penetration of the great cavities and injury of the viscera will influence the question of operation, but not necessarily forbid it."

Hysteric Joints.—Moore (*Annals of Surgery* for August) writes on "Hysteria from a Surgical Standpoint" and says that it is in joint and spine ailments that the surgeon is most likely to meet with hysteria, and it is of so frequent occurrence here and often so closely reasembles the real disease that he must ever be on his guard lest he mistake the shadow for the substance. These hysteric joint affections sometimes so closely resemble tubercular joints as to deceive very good diagnosticians, and usually follow an injury. While there may be slight atrophy, it is only that due to non-use or bandaging. There is no rise of temperature, though it may be subnormal, and while there may be slight puffiness about the joint, there is no marked swelling. The restriction of motion is different from that characteristic of tuberculosis, varying from one moment to another and even temporarily disappearing when the patient's attention is directed elsewhere. The muscular spasm is very different from that of tuberculosis, it being more marked and voluntary. The hysteric joint is usually deformed and the deformity often greatly exaggerated. The deformity is apt to be a flexion. As a treatment he has obtained the best results by reducing the deformity, holding the limb in proper position for a short time and insisting that a cure has been wrought, very little anesthetic being necessary.

Pulmonary Tuberculosis.—Stubbert (*New York Medical Journal* for July 30) in discussing "Sanitarium Treatment of Pulmonary Tuberculosis," says that the cured incipient cases are estimated at 59 per cent., statistics being compiled under the most favorable circumstances obtainable in properly conducted sanitariums. He considers the first essential in a sanitarium a routine examination in all details, basing treatment upon climatic, hygienic and dietetic influences. He considers diet an all-important factor and increase of weight a prognostic factor of great importance. At the Loomis Sanitarium all patients, unless temporarily excused, are required to remain out of doors eight hours a day, and within a month after arriving the majority of their patients are able to walk from one to seven miles a day and they do it. The room temperature is not allowed to be over 65 degrees during the day and all windows are left open at night. As to the advantages of serum treatment, he says: "1. It does not tax the function of digestion or produce gastritis, diarrhea or loss of appetite. 2. In cases wherein the bacilli have disappeared, they have been lost while *sputa were still present*, whereas in creosote cases the last specimen of sputa contained bacilli. 3. Up to the present time no relapses have occurred among our patients declared *cured by* serum treatment; they are occasion-

ally met with in creosote cases." The writer claims to treat about an equal number of patients with tuberculosis, in the sanitarium and out of it, and from his experience has found that all incipient cases do better within a sanitarium, *i. e.*, one built on the cottage plan; a smaller percentage do well outside. Statistics show that about 86 per cent. treated in a sanitarium improve, but only 58 per cent. outside, and that in 41 per cent. the disease is arrested and cured within, but in a less percentage outside. In far advanced cases he believes the patients are better off at home.

Defective Compensation in Heart Troubles.—Defective compensation in heart troubles is best remedied, according to the experience of Prof. H. Eichhorst of Zurich, with a combination of digitalis and diuretin (double salicylate of sodium and theobromin). It is indicated in every case, he states, that is not cured by absolute repose. A course of thirty powders will completely cure the edema and concomitant disturbances in nearly every case. There is sometimes a peculiar somnolence, with dyspnea and psychic troubles, but these are caused by the absorption of the edema and not by the medication, and subside as the noxious substances are gradually eliminated through the kidneys. Formula: pulverized digitalis leaves, 10 centigrams; diuretin, 1 gram; sugar, 30 centigrams. For one powder. Make xii. Take three a day after meals.—*Semaine Méd.*, June 29.

Insomnia.—In the *Maryland Medical Journal* of July 23, Bond writes on "The Therapeutics of Insomnia," defining insomnia as "Any deficiency in sleep which threatens to interfere with health." He considers too shallow sleep with dreaming, or a sleep that leaves one tired on waking, forms of insomnia, and believes that testimonials of the sleeper as to how much he sleeps are necessarily questionable; therefore the first thing in the treatment is to find out whether insomnia is really present. In either case treatment must be given, in the former, tonics until the patient forgets his alleged insomnia, in the latter, hypnotic agencies. He says: "The physician's duty is not so much to compel as to secure permission for sleep. The hindrances to sleep proceed usually not from the brain itself, but from a disorder of the blood, and this usually from abnormal processes in the kidneys and other excretory organs and in the digestive tracts, or perhaps from the inhalation of impure air. . . . . Although it is very dangerous to prophesy limitations to the progress of any science, yet I may venture to say that progress in hypnotic therapeutics will be along the line, not of a discovery of a universal ideal hypnotic drug, but of a more thorough study of the varying conditions in insomnia and of the circumstances which favor or hinder the effect of each drug."

Management of the Tuberculous Insane.—Dr. Bracken, Secretary of the State Board of Health of Minnesota, writes on the above subject warmly recommending a larger adoption of the principle of isolation at hospitals for the insane of tuberculous patients, and says further: "The greatest scourge of these institutions is tuberculosis, and there is a certain degree of apathy among physicians having charge. They do not recognize the etiologic relation between phthisis and insanity. I am convinced, however, that such causative conditions can be shown in not a few hospitals. The American Public Health Association has, by the report of its Committee on Restriction of Tuberculosis, pointed out the means of limiting the spread of this disease. By the adoption of these means the percentage of tuberculous deaths to the general death rate in one hospital has been reduced in the course of three years from an average of 25 per cent. to a fraction under 9 per cent. I was interested in this hospital report from Dr. Rohé of the Maryland hospital at Catonsville, and wrote to Dr. Wade, his successor, to learn the present condition of the tuberculous patients. He informs me that the death-rate from tuberculosis for 1896 was but 6.1 per cent. Dr. Wade describes the manner of caring for the tuberculous insane in this hospital as follows: 'The sputa of the suspected case is examined, and if the bacilli are found the patient is placed in a single room, the walls of which are painted and can be easily disinfected. The furniture consists of an iron bedstead, which is readily cleaned. There are no curtains to the windows and no carpet upon the floor. The patient is persuaded, if possible, to expectorate into a vessel, which is disinfected with mercuric chlorid. If the patient expectorates about the room no harm can be done, however, as everything can be readily washed with a disinfectant. The bedding is properly cared for and is used for no other bed. After the death of the patient, the room and all of its contents are thoroughly disinfected.'"—Transactions Conference of State and Provincial Boards of Health.

Diet for the Sick in Army Hospitals.—So much has been published in the daily press about the unsuitability of the army ration as a dietary for sick soldiers, that the War Department has practically freed the kitchens of general hospitals from any need to rely on the coffee, hard bread and bacon of the ration. Up to this time the hospitals were entitled to one ration per day for each patient. Such articles of the ration as were required for use were drawn from the Subsistence Department in kind, and the money value of the articles not drawn was available as a hospital fund for the purchase of other articles of food from the Subsistence Department or from outside parties. General orders just published authorize surgeons in charge to expend 60 cents a day per patient for the subsistence of the sick in their wards. This is simply a commutation of the ration as a whole instead of the commutation of that part of it not drawn in kind; but as the new orders commute the ration at a much higher figure than its actual value, it gives ample facilities for providing all sorts of delicacies for the sick and for rendering them independent of the charity of the various relief associations. The orders are as follows: Medical officers in charge of general hospitals, hospital trains, hospital transports and the hospital at the camp at Pablo Beach, Florida, and at the hospital at the camp at Montauk Point, New York, will be allowed to expend from the appropriation "Subsistence of the Army," for the diet of the enlisted men undergoing medical treatment under their charge, at the rate of not exceeding 60 cents per man per day for the period each is undergoing treatment. The allowance so made will constitute a special fund in the hands of the medical officer in charge, from which will be purchased the entire diet of the enlisted men while undergoing medical treatment. These purchases will be restricted to articles of food, solid and liquid, the quantities and varieties of which will be determined by the medical officer in charge. Chief commissaries of departments will transfer to medical officers in charge such subsistence funds as may be estimated for by the latter for carrying out the objects of this order. There will be rendered monthly to the Commissary General of Subsistence, by the medical officers concerned, regular accounts current supported by vouchers showing the application of these funds, and regular returns of subsistence stores accounting for the articles of food purchased and issued. There will be submitted with each monthly return a tabular statement showing the number of patients present during the month as shown by the hospital records, and the money value of the articles issued to and consumed by them. The statement will be so arranged as to show the actual cost of subsistence per man per day for the month. Transfers of subsistence funds from one hospital, train or transport to another without authority of the Commissary General of Subsistence, and the purchase from subsistence funds of articles other than food intended for diet of the sick are prohibited. This order will go into effect at once, and all surplus funds in the hands of medical officers in charge, arising from the commutation of rations heretofore allowed to enlisted men undergoing treatment under their charge, will be taken up on their accounts current for the month of August, and all articles purchased from such commutation remaining on hand unconsumed on receipt hereof will be taken up on their return of subsistence stores for that month.

Medical Supplies Recommended to Regiments.—Memorandum of recommendation of Surgeon-General, April 15, 1898, to the Adjutant-General: Each regiment to take two ambulances, four extra litters, a field hospital for ten men, medical and surgical chests, field supplies for three months. Infantry regiments to have a steward or acting steward and ten privates of hospital corps. Cavalry regiments to have two stewards or acting stewards and fifteen hospital corps men. A light battery to have one ambulance, field hospital for five men (one hospital tent), an acting steward and five privates of the hospital corps.

April 20, 1898, the Surgeon-General sent instructions to Major B. F. Pope, chief surgeon, Tampa, Fla., directing him to inspect the medical department of each regiment upon its arrival, and report to him the deficiencies in medical supplies.

CONSOLIDATED LIST OF MORE IMPORTANT ARTICLES SENT TO TAMPA AND SANTIAGO.

First aid packets	No.	39,000
Alcohol	Qt. bottles	3,502
Bicarbonate of soda tablets	No.	237,200
Calomel and soda tablets	No.	40,000
Camphor and opium pills	No.	188,000
Castor oil	Qt. bottles	1,422
Chloroform	0.2 lb bottles	3,470
Compound cathartic pills	No.	259,200
Ether	0.2 lb tins	3,200
Fowler's solution	Oz. bottles	1,180
Morphine tablets	No.	17,300
Quinin pills	No.	4,678,000
Strychnin tablets	No.	50,000
Subnitrate of bismuth	lb bottles	657
Antiseptic tablets	No.	150,000
Carbolic acid	2 lb bottles	6,000
Iron, sulphate, commercial	20 lb boxes	500
Lime, chlorid	lb bottles	4,456
Sulphur, in rolls	lbs.	4,000
Formal gas generators, with supplies for same	No.	2
Beef extract	0.2 lb tins	5,780
Brandy	Qt. bottles	977
Condensed milk	tins	3,546
Soap, castile	lbs	954
Soups (Franco-American), 24 cans in case	Cases	981
Sugar, white	lbs	2,868
Tea	lbs	495
Whisky	Qt. bottles	1,621
Stationery, a large supply to cover needs.		
Bandages, gauze, sterilized, 144 in box	Gross	839
Cotton, absorbent	lbs	1,240
Gauze, sublimated	Pkgs.	33,000
Gauze, iodoform	"	3,650
Ligatures, catgut, sterilized	"	18,600
Ligatures, silk, sterilized	"	18,600
Oakum	lbs.	1,260
Sponges, compressed cotton	Boxes	2,850
Thermometers, clinical	No.	211
Blankets, gray	"	5,440
Chairs, arm, folding	"	235
Chairs, small, folding	"	2,350
Cots, folding	"	4,250
Mattresses	"	2,500
Mosquito bars	"	3,750
Pillows, feather	"	850
Pillows, hair or cotton	"	4,250
Pillow cases, cotton	"	7,500
Sheets, cotton	"	10,000
Shirts, cotton	"	4,750
Tables, mess, folding	"	235
Tables, bedside, folding	"	2,350
Litters	"	630
Litter slings	"	975
Table and kitchen furniture, for field hospitals	for	3,000
Test tubes	No.	1,540
Medical sets, chests Nos. 1 and 2, each	"	29
Surgical sets, chests Nos. 1 and 2, sterilizer chest and filter, each	"	21

NOTE.—The regular regiments had each a medical and surgical chest, litters and other field supplies before the above articles were issued.

Societies.

The following recent meetings are noted:

Connecticut.—New Haven Medical Association, August 3.

Illinois.—Douglas County Medical Society, Tuscola, August 4; Stephenson County Society of Physicians and Surgeons, Freeport, August 4; Vermilion County Medical Association, Danville, August 9.

Indiana.—Shelby County Medical Society, Shelbyville, August 8; Vigo Medical Society, Terre Haute, August 4.

Iowa.—Council Bluffs Medical Society, August 10.

Kansas.—Topeka Academy of Medicine and Surgery, August 8.

Kentucky.—Union County Medical Society, Morganfield, August 1.

Massachusetts.—Berkshire Medical Society, Pittsfield, August 4.

Michigan.—Bay County Medical Society, Bay City, Aug. 15.

Minnesota.—Southern Minnesota Medical Association, Rochester, August 4.

Missouri.—Central District Medical Society of Missouri, Sedalia, August 4; Jasper County Medical Society, Webb City, August 2; Linn County Medical Society, Meadville, July 26; Putnam County Medical Society, Unionville, August 3.

New York.—Steuben Medical Society, Addison, August 9.

Pennsylvania.—Bucks County Medical Society, Bristol, August 3; Lehigh Valley Medical Society, Allentown, August 9; Luzerne County Medical Society, Wilkes Barre, August 10; York County Medical Society, York City, August 4.

Texas.—Kaufman County Medical Society, Kaufman, Aug. 1.

Wisconsin.—Waupaca County Medical Society, Elwood, August 5.

Philadelphia.

OBSEQUIES OF DOCTOR PEPPER.—The body of Dr. Pepper reached Philadelphia from California August 5, and the remains viewed by only a few intimate friends. On Saturday simple services were held at St. James Episcopal church, the interment being strictly private. The honorary pallbearers were William Platt Pepper, General Isaac Wistar, Edward H. Clark of New York, William Latta, Mayor Charles F. Warwick, Dr. S. Weir Mitchell, representing the trustees of the University of Pennsylvania; Dr. Jonas Tyson, representing the medical faculty of the University; Frederick Fraley, representing the American Philosophical Society; Joseph G. Rosengarten, representing the Free Library; Ex-Senator George F. Edmunds, representing the Philadelphia Museums; P. A. B. Widener, representing the Philadelphia Exposition Association, and Hampton L. Carson, representing the general alumni of the University of Pennsylvania; Governor Hastings was unavoidably absent. Two provisions of Dr. Pepper's will have been complied with, one of which was that his body be cremated, the other that his brain be given the Anthropological Society of which he was a member, the latter clause being one of the agreements on becoming a member. Among others who have belonged to this society may be mentioned Dr. Joseph Leidy and Phillips Brooks.

SANITARIUM FOR CONSUMPTIVES.—Some time ago the Board of State Charities made a recommendation appropriating $30,000 for the erection of a sanitarium for consumptives, with the proviso that a like sum be raised by private subscription. Unfortunately this measure never passed the legislative committee rooms. The overcrowded condition of the almshouse in Philadelphia would enlist the sentiment of the members if they would visit it, but this will not probably be done. The Pennsylvania Society for the Prevention of Tuberculosis is again bringing this subject to the front and giving many good explanations of the benefit which would arise from the erection of a building for this purpose. A location has been found in Lucerne County, and offered as a site for the proposed building. A city sanitarium for the treatment of cases of tuberculosis is also being agitated.

BRONZE STATUE TO DOCTOR PEPPER.—The many societies and public enterprises of this city to which Dr. Pepper belonged have all passed fitting testimonials to his memory. Among others may be mentioned the Philadelphia Club, trustees of the Department of Archæology and Paleontology of the University of Pennsylvania, and a committee of the Philadelphia Museum. Some time before his death the Department of Archæology and Paleontology of the University decided to erect a testimonial to his memory. This testimonial will now give way to a memorial bronze statue by Bitter of New York, who will also carve the granite foundation on which the statue will rest. The figure represents the doctor in a sitting posture and in a pensive and characteristic attitude.

DR. JOHN GUITÉRAS HOME.—The excessive duties imposed upon Dr. Guitéras while with the army in Cuba finally overcame him and after being in bed for several days with the prevailing fever in the army, he returned home greatly debilitated on August 5. Questioned as to the most serious diseases which threatened the army at the present time, he stated that typhoid and malarial fevers were the worst foes yet encountered. Up to the present time yellow fever had been of a mild

type and but comparatively few deaths had resulted. Regarding the report of differences between himself and the Red Cross Society, he dismissed it by stating that it was absolutely without foundation, and further remarked that "there was only one dispute of importance down there, and that occurred between the Spaniards and Americans."

An Interesting Case.—It is reported that George H. Wheaton, an employe of Cramp's shipyard, Philadelphia, recently fell from a scaffold, striking on his head and shoulders. Not thinking his injuries serious he remained around the factory for some time but, subsequently, complaining of vague pains, was given permission to go home. After crossing the Delaware river and reaching the opposite shore in Camden he walked for some distance, but became dizzy and was seen to suddenly fall. He died a few minutes later. On subsequent examination at the Cooper Hospital, Camden, there was found a fractured vertebra.

Charitable Bequests.—The following institutions have been made beneficiaries by the will of Jane K. Barclay, who recently died in this city: The Presbyterian Hospital, $5,000; the Home for Widows and Single Women, $5,000. By the will of Emily A. Lippincott the following bequests have been made: To the Hospital of the Protestant Episcopal church, $5,000, an endowment for a free bed; to the Children's Hospital, $2,500. In addition $2,500 was also given as an endowment for a perpetual free bed.

Still Watching for Yellow Fever.—If yellow fever enters this city it doubtless will come by means of railways. The State Board of Quarantine is keeping a strict watch on all lines of boats and steamships which come to this port. A recent resolution was passed to the effect "that on and after August 1, and until further notice, every vessel arriving here from Cape Henry shall be inspected at the Quarantine Station under a penalty of $500." This city had enough of this disease in 1893.

Health Report.—For the week ending August 6, 484 deaths have been reported to the Board of Health. Of these 217 were children under five years of age. Of the total number there is an increase of nineteen over the preceding week and an increase of seventy-two over the corresponding period of last year. Thirty deaths resulted from sunstroke. Infectious diseases: Diphtheria, 29 cases, 10 deaths; scarlet fever, 17 cases, 1 death; typhoid fever, 59 cases, 19 deaths.

Sunstrokes are Common.—On July 30 there occurred in this city thirty cases of sunstroke. This is the second largest number recorded this summer, the highest being in the earlier weeks of the month, when forty prostrations occurred. It has been reported by the Weather Bureau that the past few months have been the hottest for thirty years. Two suicides have occurred during the past week, superinduced, it is believed, by the intense heat.

St. Joseph's Hospital.—While the physicians are off on their vacation, improvements are going on at the St. Joseph's Hospital. New operating, sterilizing and anesthetizing rooms will take the place of the space formerly utilized for this purpose, and when finished it is hoped that the new accommodations will take rank with the best of this city.

Louisville.

Kentucky School of Medicine.—This college is once more before the public on account of internal dissensions. As recorded in these columns some months ago, the majority of the Faculty declared the chairs occupied by Drs. W. H. Wathen, M. F. Coomes and Henry Orendorf vacant, asking the Board of Regents to ratify its action. After a trial of the charges preferred, the Board refused to concur because of constitutional reasons, and the last session was taught with all three as members of the Faculty. After the conclusion of the term, the majority of the Faculty brought suit in the local court to dissolve the corporation and make the sale of the college property possible. Pending this suit, which was docketed for the October term, the three members, Drs. Wathen, Coomes and Orendorf, declared the chairs occupied by Drs. C. W. Kelly and Sam. E. Woody, also dean, vacant, and their action was ratified by the Board of Regents, over the protest of the President of the Board, Mr. Jos. P. Helm. Drs. Wathen, Orendorf and Coomes, in the absence of Dr. J. M. Mathews and Dr. J. B. Marvin, who were out of the city, then elected Dr. Sam. Cochran, professor of anatomy, vice Dr. Kelly, and Dr. Arthur G. Boyd (*a graduate from the school in 1896*), as professor of chemistry, and proceeded to elect Dr. W. H. Wathen dean and Dr. H. Orendorf as secretary. Notice was served on the postmaster by both the factions, Dr. Woody, who claims to have been illegally deposed from the deanship, and Dr. Wathen, the new dean, to deliver all mail to them; but the postmaster, complying with the post-office regulations, is holding all mail and marking it "in dispute." Dr. C. W. Kelly is fishing in the northern lakes; Dr. J. B. Marvin and Dr. J. M. Holloway are in Europe, so it is not known what action will be taken.

Mathews.—Dr. J. M. Mathews, president elect of the American Medical Association, has resigned the position of professor of surgery and lecturer on diseases of the rectum in the Kentucky School of Medicine, and has accepted the same chair in the Hospital College of Medicine, having been elected to the latter position very recently. He will divide the chair of surgery with Dr. H. H. Grant, holding the same title as before in the Kentucky School. His resignation also carries with it membership in the Board of Regents of the Kentucky School. Dr. Mathews states he was led to make the change because of his dislike for such disagreeable occurrences as are now taking place in his former school

Executive Committee.—The Executive Committee of the Mississippi Valley Medical Association met at the Louisville Hotel on the evening of the 15th, transacting much important business.

Anthrax.—Several cases of anthrax have been discovered in a herd of milch cows in the lower end of the city, which has been quarantined by the State Veternarian. Some action will be taken by the State Board of Health against Indiana, where anthrax is said to be prevalent.

Vacations.—The following members of the local profession are away from the city: Drs. J. B. Marvin and J. M. Holloway, in Europe; Drs. L. S. S. McMurtry and C. W. Kelly, among the Canada lakes, fishing; Dr. Wm. Bailey, in Michigan; Dr. J. T. Dunn and Dr. P. B. Scott have just returned from a sojourn in New York City.

Cochran.—Dr. Sam Cochran, who recently resigned his position as local Marine Hospital Surgeon, is now lying critically ill with typhoid fever. Dr. Cochran has been making personal attacks upon Dr. C. W. Kelly through his journal, the *Louisville Medical Monthly*, and both he, as editor, and the publisher, have been enjoined by court to cease publication of personalities.

Smallpox.—Jackson, Ky., has another case of smallpox, on account of which the Teacher's Institute and the Circuit Court in session, were adjourned. The Board of Health was compelled to build a pest house on a remote mountain point.

Health Board.—The Quarterly report of the Indiana State Board of Health, just published, shows some queer facts. The total number of deaths for the quarter is 3368. Of these only six were caused by phthisis, one by pneumonia; and not a single death from typhoid fever. There were 7165 births, with 3660 males, a decrease in the total number of 667 for a corresponding date last year. There were 160 illegitimate births; 4952 marriages were recorded, 131 of the husbands being under 20 years of age.

Nettleroth.—Dr. Alexander W. Nettleroth has just received his commission as assistant-surgeon in the army and has been ordered on duty with the First Army Corps at Chickamauga. He was the second honor man of his class at the Louisville Medical College this year.

Meyers.—Dr. Sidney J. Meyers has returned from Chickamauga on sick leave of fifteen days, having contracted malaria while on duty there.

Filtration.—The Louisville water company has advertised for bids for construction of a filtration plant, which will be opened September 1. This means that Louisville will have within the next year one of the largest filtration plants erected by any municipality. As recorded in these columns, the details of this plant are the results of experiments carried on by several patented methods at the waterworks pumping-station under the supervision of experts employed by the water company. This work consumed about two years, and the plan adopted is the American system, which has received the endorsement of many continental towns of Europe. It comprises the sand process with a quick coagulant; the exact process, however, has not been announced by the company. The new filtration plant will be 24 feet high, 392 feet long and 116 feet wide, built of stone and adorned. The bidders for the

work must give a bond of $100,000 and they are limited to residents of Louisville and Jefferson County.

LAY OPINION.—The *Courier-Journal*, in commenting editorially on the death of Rear Admiral Kirkland, refers to the surgery in his case as "one of those delicate surgical operations which have become so common within the last few years;" the death of Admiral Kirkland "illustrating the fallibility of medical prognosis;" going on to state that after an apparently successful operation one of the surgeons was quoted as expressing the opinion that the operation was highly successful and most satisfactory, and had it been postponed twenty-four hours the illness would have proven fatal, yet in spite of this the patient sank rapidly and died two days later. It is stated that this is one of so many deaths following operations that eminent surgeons in this country and Europe are lifting their voices in warning against reckless practitioners whose anxiety to perform capital operations prompts them to take enormous risks. After this, and further condemnation of surgeons and surgical procedures, the article concludes with the following words: "That in Admiral Kirkland's case the work was done only upon the most mature deliberation and as a last resort does not alter the truth of all this." From such articles as these and they are by no means infrequent, the laity form their opinion of surgery and refuse any surgical interference even when absolutely demanded.

THE PUBLIC SERVICE.

Movements of Army Medical Officers.—Assigned to duty with the Second Army Corps, Camp Alger, Va.: Acting Assistant-Surgeons Wm. B. Summerall from Atlanta, Ga.; D. T. McKinney from New Brighton, Penn., and Alfred B. Giles from Baltimore, Md. To Ponce, Porto Rico, via Fort Monroe, Va.: Acting Assistant-Surgeon John N. Goltra from Buffalo, N. Y. To General James F. Wade as Chief Surgeon on his Staff: Major J. L. Powell, Surgeon U. S. Army. To duty with troops at Chickamauga Park, Ga., the following acting assistant-surgeons: Geo. G. Morris, Victor E. Watkins and Ernest W. Fowler from Washington, D. C.; O. C. Heiss from Nebraska City, Neb.; Robert L. Bartlett from New York City, N. Y.; Geo. H. Calkins from Tonowanda, N. Y.; Henry B. Stotter from Cleveland, Ohio; Frank E. Crossier from Lebanon, Ohio, and Robert C. Rind from Towson, Md. To duty with troops at Tampa, Fla.: Acting Assistant-Surgeons Thos. C. Avery from Washington, D. C., and Elbert E. Persons from Chicago, Ill. To General Shafter at Santiago, Cuba, via Tampa, Fla.: Acting Assistant-Surgeons Henry H. Bradley from Buffalo, N. Y., and Lewis B. Childs from Washington, D. C. To the Commanding General, camp at Montauk Point, Long Island, N. Y.: Major C. L. Heizmann, Surgeon U. S. Army, and Major Robert Burns, 1st New Hampshire Volunteer Infantry from Lookout Mountain, Tenn. To the General Hospital at Montauk Point, Long Island, N. Y.: Major Charles S. Nancrede, Brigade Surgeon from 1st Division, 2d Army Corps and Acting Assistant-Surgeons Frank C. Jones from Cleveland, Ohio, Harry C. More from New York City, N. Y. and A. R. Booth from Washington, D. C. To the General Hospital, Fort Thomas, Ky.: Major Wm. R. Hall, Surgeon U. S. Army, from the General Hospital, Key West, Fla., to take charge. To the Leiter General Hospital, Chickamauga Park, Ga.: Acting Assistant-Surgeons B. R. Shurly from Washington, D. C.; W. C. Berlin from Cleveland, Ohio and John B. Alwin from Athens, Ohio. To the General Hospital, Key West, Fla.: Captain Henry A. Shaw, Assistant-Surgeon U. S. Army, from Key West Barracks, Fla. To the General Hospital, Washington Barracks, Washington, D. C.: Acting Assistant-Surgeons Wm. J. Ashby from Alexandria, Va., and J. R. Shannon, whose former orders are revoked. To the Hospital Train at Tampa, Fla.: Capt. H. A. Shaw, Assistant-Surgeon U. S. Army. To the General Hospital at Fort Monroe, Va.: Lieut.-Colonel A. A. Woodhull, Deputy Surgeon-General U. S. Army. To the General Hospital, Fort Myer, Va.: Major Elmer E. Heg, Brigade Surgeon, and Acting Assistant-Surgeon Harold W. Cowper from Buffalo, N. Y. To the General Hospital, Fort McPherson, Ga.: Acting Assistant-Surgeon James C. Ross from Salt Lake City, Utah. To the U. S. Hospital Ship *Missouri*: Major Wm. H. Arthur, Surgeon, U. S. Volunteers, to command. To proceed to their homes: Major Victor C. Vaughan, Surgeon 33d Michigan Vol. Infantry, and Acting Assistant-Surgeon Frank Donaldson. Resigned: Capt. John H. Dickerson, Assistant-Surgeon 9th Battalion Ohio Volunteers.

A Sanitary Order from the War Department.—The following was issued August 10 by the Adjutant-General of the Army:

In order to prevent as far as possible the diseases incident to encampments of large bodies of men, namely: typhoid and malarial fevers, diarrhea and dysentery, and the further spread thereof where these diseases have already gained more or less headway, all officers, from the commanding general to company commanders, will exercise the utmost vigilance to enforce proper sanitary conditions in camp and strict cleanliness of the person.

The speedy destruction or removal with safety of all decaying substances present and future, and the rendering innoxious the feculent matter of the camp, must be accomplished.

The Quartermaster's Department will furnish lumber for floors to all tents. The general commanding camp will at once provide ample hospital facilities by erecting barracks where there is a shortage of hospital tents.

No effort will be spared to carry this order into effect to the fullest extent, and to this end those concerned will not rest content with the issuance of orders upon the subject, but they or their representatives, duly impressed with this grave responsibility, will immediately see to the commencement, continuance, superintendence and practical accomplishment, day by day, of the instructions imposed upon the command.

The attention of all concerned is called to Army Regulations concerning interior economy, police, and discipline of companies, to Circular No. 1, Surgeon-General's Office, April 25, 1898, to "Marches" and "Camping" in the authorized Drill Regulations, to "Soldier's Handbook" and the remarks therein compiled. From these easily accessible data, supplemented by his own practical experience and that of others, the commanding general of each camp will at once prepare and put into immediate execution a simple code of rules, of the daily practical accomplishment of which he will assure himself, rendering daily reports to the Adjutant-General of the Army.

By order of the Secretary of War.

H. C. CORBIN, Adjutant-General.

Promotions in the Marine-Hospital Service.—Passed Assistant-Surgeons to be Surgeons: Cyrus T. Peckham, Aug. 10, 1898; Arthur H. Glennan, Aug. 10, 1898; Eugene Wasdin, Aug. 10, 1898; Stephen D. Brooks, Aug. 10, 1898; Joseph H. White, Aug. 10, 1898.

CHANGE OF ADDRESS.

Bell, J. W., from 2301 to 2301 S. Bryant Av., Minneapolis, Minn.
Blech, G., from 6236 Sangamon St. to 1443 Michigan Av., Chicago.
Behle, W. H., from Blackfoot, Idaho, to Summit Blk., Salt Lake City, Utah.
Campbell, T. F., from Springview, Neb., to Fairfax, S. D.
Cleveland, C. C., from 1215 W. 23d St. to 1215 W. 33d St., Minneapolis.
Emmerson R., from Chicago to care of Mexican National R. R., San Luis Potosi, Mexico.
Gibben, J. H., from Philadelphia, Pa., to Jefferson Barracks, Mo.
Hatfield, M. P., from Col. Mem. Bldg., to R. 400 Reliance Bldg., Chicago.
Hodges, F. J., from Anderson, Ind., to Ashland, Ohio.
Huecker, Jno., from Ferguson Bldg. to 700 15th St., Denver, Colo.
Herr, A. W., from Woodburn, Iowa, to Battle Creek, Mich.
Hill, W. H., from New Castle, Mo., to Gentryville, Mo.
Hertzie, D., from 2544 Montgomery, to 112 E. College St., Louisville, Ky.
Maguith, W. A., from 1184 Wilcox Av., to 1375 W. Harrison St., Chicago.
Klasen, J. P., from Chicago to Huron, Ohio.
Kempker, J. F., from Des Moines to Houghton, Iowa.
Lesan, C. T., from Bedford to Mt. Ayr, Iowa.
Munson, S. E., from Mt. Pulaski to Rochester, Ill.
Morgan, R. G., from 234 N. Penn to Ind. Med. Coll., Indianapolis, Ind.
Minard, E. J. C., from Brooklyn, N. Y., to Chicago, Ill.
McCreery, R. L., from University Park to 136 Grant Av., Denver, Colo.
Maclean, D., from Detroit, Mich., to Hotel Chamberlin, Fortress Monroe, Va.
Patterson, H. A., from Brayfield to Downing, Ill.
Pinto, A. S., from Omaha, Neb., to 3d Div., Hospital, Panama Park, Fla.
Prather, D. J., from Oakland to Gen. Del., Sacramento, Cal.
Plummer, R. W., from Mt. Vernon, Ill., to Tyrone, Pa.
Runde, F. W., from St. Louis, Mo., to Room 9 McClintock Blk., Denver.
Sandow, B. F., from Meihart, to Helena, Mont.
Schauffler, E. W., from 800 Main St. to 1220 Washington St., Kansas City, Mo.
Stevens, A. M., from Ann Arbor, Mich., to 143 E. Berry St., Ft. Wayne.
Southard, W. F., from 603 to 1220 Sutter St., San Francisco, Cal.
Stone, C. A., from Weldon to Mason City, Ill.
Smolt, C. F., from Newton to Ottawa, Kas.
Savage, G. H., from Nashville, Tenn., to Sherman, Texas.
Thoms, S. J., from Ann Arbor to Corey, Mich.
Van Tuyl, H. I., from Chicago to 103 Congress St., Ypsilanti, Mich.
Van Urk, T., from Ann Arbor, Mich., to 55 Hudson Av., Rochester, N. Y.
Williams, C. B., from Ann Arbor to Adrian, Mich.
Woodbridge, J. E., from Chicago Beach Hotel to Fort Myer, Va.

LETTERS RECEIVED.

Allen, D. P., Cleveland, Ohio; Alexander, A. J., Mayfield Ky.; American Therapeutic Co. (2), New York City; Ascher, A., Cherry Creek, Nev.
Bovinine Co., The, New York City; Bundy, J. A., Iroquois, Ill.; Bredt & Co., J. M., Chicago; Bullard, J. W., Pawnee City, Neb.
Clements, J., Kansas City, Mo.
Dagney, T. F., Philadelphia, Pa.; Ducker, Orlando, Santiago, Cuba.
Emmet, J. D., New York City.
Fairchild Bros. & Foster (2), New York City.
Goodhue, Geo., Dayton, Ohio; Guthrie, J. A., Portsmouth, Va.
Hare, H. A., Philadelphia, Pa.; Hirschwald'sche Buchandlung, Berlin, Germany; Hummel, A. L., Advertising Agency, New York City.
Judson, W. B., Chicago; Jenkins, D. J., Huntsville, Ohio.
Kempson, J. F. & Co., New York City; Kegel, E. T., Walcott, Iowa; Klie, G. H. Chas., St. Louis, Mo.; Kress & Owen Company, New York City; Little, C. H., Piqua, Ohio; Lowder, R., Ledyard, Iowa; Lewis, Le Roy, Auburn, N. Y.
Merrick, M. B., Passaic, N. J.; Magruder, G. T., Washington, D. C.; Macdonald, Geo. C., San Francisco, Cal.; Massey, G. Belton, Philadelphia, Pa.; Moreland, W. H., Manitou, Colo.; Moss, H. C., Albion, Ill.; Mann, F. W., Detroit, Mich.; Mercer, A. Clifford, Syracuse, N. Y.; Macfarlane, R. F. (2), Queensboro I., N. Y.; Mitchell, T. E., Columbus, Ga.; Milbury, Frank S., Brooklyn, N. Y.; Mogk, W. A., Ann Arbor, Mich.; McDermith, S. T., Denver, Colo.; Montgomery, Liston H., Chicago; Moreland, W. H., Manitou, Colo.
Newberry Library, Chicago; Norstrom, Henry, Boone, Iowa.
Pagels, Geo. H., Columbus, Ohio; Physicians Outfitting Co., Kansas City, Mo.; Patton, F. W., St. Louis, Mo.; Payne, T. E., Philadelphia, Pa.; Parsons, J. W., Portsmouth, N. H.; Parker, Chas. A., Orange, N. J.
Roosa, D. B. St. John (2), New York City; Robertson, E. H., Boulder, Colo.; Rawlings, J. A., El Paso, Texas; Rutherford, C. W., Newman, Ill.; Reed, J. D., Topeka, Kas.
Sipe, W. P., Florence, Colo.; Sorby, Harold, Chicago; Stall, J. J., Chicago; Shafer, R. C., Wilgus, Ohio; Snyder, L. A., Chicago; Sprague, W. B., Eureka Springs, Ark.; Sanders, W. H., Montgomery, Ala.; Smith, W. E., Atlanta, Ohio; Swart Bros., Detroit, Mich.; Stone, R. French, Indianapolis, Ind.
Tate, S. A., Stroughurst, Ill.; Tyson, James, Philadelphia, Pa.; Twinch, Sidney A. (2), Newark, N. J.; Tracy, J. L. (2), Toledo, Ohio.
Waxham, F. E., Denver, Colo.; Woldert, E. A., Atlantic City, N. J.; Waters, G. M., Columbus, Ohio; Wiggin, F. H., New York City; Wagar, Chas. P., Toledo, Ohio.; Whittaker, Jas. T., Cincinnati, Ohio; Woodruff, E. W., Columbus, Ohio; Wagner, Jas. H., Selma, Cal.; Wilbur, C. T., Kalamazoo, Mich.